THE

ELECTRICAL WORLD

A REVIEW OF CURRENT PROGRESS IN ELECTRICITY
AND ITS PRACTICAL APPLICATIONS

VOLUME LXII

JULY 5 TO DECEMBER 27, 1913

McGraw Publishing Co., Inc.
239 West 39th St.
New York City

INDEX TO VOLUME LXII

GENERAL INDEX

Entries from the Digest of Current Electrical Literature are indicated by D (Digest)

A

Accident prevention by using electric lamps, *857
Accidents:
——Automobile, Electrical men in, 317
——Boiler explosion in Staten Island power plant, 829, 933
——Chicago, Electrical, 491
——Deckerville, Mich., Plant wrecked, *1302
——Great Britain, Electrical, (D.) 248
——Ogden, Utah, Power plant wrecked, 938
Accounts:
——Classification of. By N. E. Webster, 1037
——Daily record of net profits. By H. R. Brand, 1038
——Discounts in the settlement of. By F. P. Vose, 1038
——System for small lighting companies. By R. B. Fowles, 380
——Unit-cost accounting, Muncie, Ind., *1271
Actinium in electric fields, Distribution of the active deposit of. By H. P. Walmsley, (D.) 811
Advertising by central stations:
——Atlanta, Ga., Newspaper publicity, 1161
——Baltimore, Living picture window display, *139
——Barometer, an advertising novelty, *139
——Battery box of automobiles, Use of, *849
——Bills, Using back of, Greenfield, Mass., 434
——Boston:
Motor service sign, *1328
News card, *1112
——Chicago:
Exhibition car of the Middle West Utilities Co., *188
Illuminated billboard, *186
——Connecticut River Transmission Co., *381
——Dallas, Texas, Sky-line float, *1064
——Elkhart, Ind., Electric float, *1012
——Envelopes, Advertising on, 641
——Exhibition car of Middle West Utilities Co., *188
——Exhibition case for drug stores, 1161
——Fort Wayne, Ind., Tungsten lamp campaign, *959
——Greenfield, Mass., Using back of bills, 434
——Greenwich, Conn., Moving-picture show, 431
——Harrisburg, Pa., Window display, *904
——Hot Springs, Ark., Advertising on envelopes, 641
——Joliet, Ill., Window displays, *1163
——Joplin, Mo., Use of vacant store windows, 1014
——Kansas City, Mo., Illuminated bulletins, *35, 237
——La Crosse, Wis., Exhibit, *901
——Little Rock, Ark., Slogan sign, *905
——Los Angeles, Cal., Fan display on moving truck, *902
——Louisville, Ky., Hot-weather window display, *37
——Meridian, Miss., Signs on electric vehicles, *710
——Merrill, Wis., Flat-iron float, *187
——Minneapolis, Signs on walls, *747
——Moving picture slides, *847
——Muncie, Ind., Advertising wired dwellings for rent, 802
——New Orleans:
Fan estimating contest, 486
Portable exhibit booth, *434
Street-car folder advertising, *591
——Newark, N. J., Booklet, *698
——Newton, Mass., for electric cooking, *35
——Printed and direct-contact methods. By D. H. McDougall, 71
——St. Louis:
Fan billboard, *335
Showrooms, 87
——Seattle, Wash., Float in parade, *289
——Store windows, Utilizing vacant, 1014
——Syracuse, N. Y., Pump window display, *865
——Titusville, Pa., Booth at fair, *1060
——Toronto, Canada, Billboard at fan time, *288
——Worcester, Mass., Window displays, *958, *1327
——Yonkers, N. Y., Moving electrical exhibit, *591
——Youngstown, Ohio, Window display, *1113, *1326
——(See also Central-station business; Sign and decorative lighting)
Agriculture, Electricity in:
——California delta lands. By R. B. Mateer, *36
Agriculture, Electricity in: (Continued)
——Data on the use of electricity by the farmer. By C. J. Rohrer, (D.) 969
——Electroculture experiments near Dayton, Ohio. By H. G. Dorsey, *1217
——Ensilage cutters and dry-feed grinders, Near Muncie, Ind., *958
——Farm equipment. By J. C. Parker, 70
——Farm of James J. Hill, 1062
——Feed cutter, Motor-driven, *88
——Noblesville, Ind., Lighting and motor-service, *749
——Plant growth forced by electric light, 770
——Power required for farm machinery, 1163
——Windsor, Vt., Small station supplying electricity to rural community, *1153; Comment, 1141
Air filter plants for generators, British, (D.) 859
Air-gaps in moving coil instruments. By C. G. Garrard, (D.) 200
Air purification by the ozone machine. By W. A. Sawyer, H. L. Beckwith and E. M. Skolfield, 993; C. P. Steinmetz, 1093; Comment, 1089; A. Vosmaer, (D.) 1175
Air velocity, Measurement of. By H. Gerdien, (D.) 1022
Air washer, Kauffman motor-driven, *348
Alabama Light and Traction Association, Annual meeting, 1197
Alarm circuit for step-bearing accumulator, *965
Alarm gong, Motor-driven, *1276
Alloys, Magnetic properties of. By G. Goldberg, (D.) 440
Alpha particles in simple gases, Range and ionization of. By T. S. Taylor, (D.) 810
Alternating-current circuits surrounded by magnetic material, Effective resistance and reactance. By. W. V. Lyon, *1006; Comment, 987
Alternating-current, Definition of, Report of German Association of Electrical Engineers, (D.) 494
Alternating-current diagrams, Rotation of phases defined, (D.) 390, 439, 968; By Fritz Emde, (D.) 757
Alternating-current systems, Advantages of utilizing synchronous motors and converters for improving the power factor. By H. L. Wallau, 1057; Comment, 1035
Alternating-current vector diagrams, Direction of advance in, 771
Alternating wave-form, Condenser current method for determining. By Frederick Bedell, *378; Comment, 361
Alternators (See Generators)
Aluminum cell for transformation of frequency. By J. Zenneck, (D.) *44
American Electric Railway Association, Convention, 724, 779
American Electrochemical Society:
——Convention, 169, 573
——October meeting, New York, 673
American Engineering Association, Proposed. By Dr. William McClellan, 15; Comment, 1
American Institute of Electrical Engineers:
——Affairs, 316, 773, 880, 1036
——Convention in June, Cooperstown, N. Y., 2, 8, 15, 81
——Convention in September, Pacific Coast, 366, 629
——Electrical equipment of gasoline automobiles. By A. E. Waller, A. Churchward and Frank Conrad, *1041
——Membership classification, Withdrawal of suit, 724
——New York meetings, October and December, 616, 1144, 1244
——Philadelphia meeting, October, 780
——Pittsburgh meeting, October, 831
American Museum of Safety, Conference, 1196
American Physical Society, October meeting, 830
American Society of Heating and Ventilating Engineers, Annual meeting, 173
American Society of Mechanical Engineers, Annual meeting, 988, 1149
American Society of Refrigerating Engineers, Convention, 802
American Telephone & Telegraph Co.:
——Government suit against, 221; Comment, 218; By R. L. Lunt, 340; T. N. Vail, 365, 1092, 1249
——Option on property of Chicago Tunnel Co., 223, 224
——Settlement of suit, 1299, 1303
Ammeter and voltmeter, Kernel combination, *552
Amortisseurs, Use of, and the parallel operation of alternators. By P. Boucherot, (D.) 1227, 1281
Ampere-hour meter for alternating current. By J. Busch, (D.) 440
Anesthesia, Diehl apparatus for producing electrically, *603
Anglo-American Exposition, London, in 1914, 168, 989
Anti-trust legislation, 1193
Antimony alloys, Magnetic properties of. By graphical mathematics, (D.) 811
Aphegraph, an electrical instrument for use in graphical mathematics, (D.) 811
Appliance sales, (See Central-station business)
Arc, Extinguishing, on breaking a circuit. By W. Burstyn, (D.) *1072; Comment, 1034
Arc between iron electrodes, Rotations in. By W. G. Cady, (D.) 1071
Arc discharges, Electrodynamics of. By Szarvassi, (D.) 1021
Arc-lamp hangers:
——Line Material Co., *48
——Thompson cut-out, *103
Arc lamps:
——Classification; incandescence of electrodes, Luminosity of arc streams. By S. H. Blake and L. H. Couchey, (D.) 296
——Competition with the improved tungsten lamp, 265
——Deposit upon poles of metallic arcs. By W. G. Duffield, (D.) 548
——Dia, having flaming arc carbons held one above the other. By P. Hoegner, (D.) 599
——Electrodes:
Carbon and impregnated electrodes, Composition, manufacture, operating characteristics and life of. By A. T. Baldwin, *793; Comment, 771
Rondal patent, (D.) 757, 809
——Evaporation temperature of carbon. By Lummer, (D.) 296
——Flame:
Differentially wound long-burning, Koerting & Mathieson, *554
Electro Development Co., *1343
Hirschberg, *1344
Focusing-type, Adams-Bagnall, *500
German long-burning, *1077
Improvements, 457
New British alternating-current, (D.) 1123
Water in lamps. By W. R. Mott, 1220
Westinghouse. By T. J. Pace, 183
——Luminous-arc, Street-lighting in Boston, Cambridge and Lynn, Mass., *469
Arcless interruption of circuits. By F. Kraus, (D.) 860
Armature mmf relations in synchronous machines. By J. H. Morecroft, *1106
Armatures:
——Direct-current, Calculation of. By J. Kuntziger, (D.) 1123
——Grounds, Locating method, *295
——Terms "right-handed" and "left-handed." By H. MacCallum, (D.) 859
Association of Austrian and Hungarian Central Stations, Annual convention. By K. Perlewitz, (D.) 1074
Association of Edison Illuminating Companies, Annual convention, 461, 513, 566; Comment, 561
Association of Iron and Steel Electrical Engineers, Convention, 564, 621, 682
Association of Railway Electrical Engineers, Convention, 772, 833, 882
Associations, Future of. By C. H. B. Chapin, 726
Atlantic Gas & Electric Company, Annual convention, 728
Atoms:
——Constitution of. By A. C. Crehore, (D.) 148; N. Bohr, (D.) 148, 704, 1339
——Energy required to ionize. By R. T. Beatty, (D.) 199
——Specific inductive capacity and atomic charges. By F. Sanford, (D.) 149
——Structure. By J. J. Thompson, (D.) 1125; J. J. Thomson and E. Rutherford, 618
Austria-Hungary, Electrical industries in. By E. Honigmann, (D.) 147
Austrian technical societies, General congress of. By Dr. Gino Dompieri, 753
Automobile batteries:
——Baltimore thin plate, *813
——Crompton "electric valve" for controlling discharge rate, *294

*Indicates illustrated articles.

262860

Automobile batteries: (Continued)
——Developments in lead batteries, 1025
——Edison nickel-iron, *395
Automobile battery charging apparatus, Electric Products Co., *101
Automobile business of central stations:
——Co-operation with manufacturers. By E. L. Callahan, 886
——Denver, Colo., 748
——Department-store service, Investigation of, 186
——Discussions at Electric Vehicle Association of America, 960
——Hartford, Conn., Battery interchange system on mileage basis, *473
——Louisville, Ky., 1060
——Memphis, Tenn., Charges, 802
——Monthly consumption of vehicles and trucks, Statistics of various cities, 803
——Rates for charging vehicles, Various cities, 748
——Report by Association of Edison Illuminating Companies, 569
——Salem, Mass., 901
——Schenectady, N. Y., Saving with electric trucks, 957
——Toronto, Can., Charging rate, 801
——Value of the electric vehicle to the central station. By W. H. Snow and D. B. Beaman, 627
——Vancouver, B. C. By C. Rummel, 185
——Worcester, Mass., 1269
——(See also Trucks, Industrial)
Automobile lamps:
——Cannevel "eyeball," *1130
——Chauffeur's, 963
——French orbicula lantern, *812
——Golden Glow, Esterline Co., 395
——Herrick Aiken rotating, *972
——Roffy-Grace Corporation, *1078
Automobile radiators, Electric heater for, Laclede Gas Light Co., *442
Automobile starting and lighting system, Adams-Bagnall, *348
Automobile, Electric, Commercial (See Trucks, Industrial)
Automobiles, Electric, Pleasure:
——Bailey, Fast long distance runs, 882, 937, *1159
——Borland-Grannis in difficult run, *591
——Chicago situation in 1913, 992
——Comparison with gasoline machines. By S. G. Thompson, 184
——Detroit car's 82-mile country-road run, *538
——Discussions at Electric Vehicle Association of America, 960
——England, Edison accumulator. By W. H. L. Watson and R. J. Mitchell, (D.) 97
——Europe. By F. W. Moock, (D.) 1339
——Massachusetts, Number in, 1217
——Number in use in United States, 1012
——Private car livery service, 137
——Run from Amesbury, Mass., to Burlington, Vt., 617
——Runs, Long distance, by Bailey machine, 882, 937, *1159
——Waverly four-chair brougham, *1025
Automobiles, Electric three-wheeled laundry, *551
Automobiles, Gasoline, Electrical equipment of. By A. E. Waller, A. Churchward and Frank Conrad, *1041; C. E. Wilson, (D.) 1339
Auto-transformers, Two-phase to three-phase. By R. E. Uptegraff, *589; R. W. Van Norden, 805
Axle-lighting equipment, Electric Storage Battery Co., *916

B

Bakelite micarta and its applications. By R. W. E. Moore, (D.) 495
Battery, Plunge-type, for experimental use. By H. E. Dey, *1210
Battery charging panels, Cutler-Hammer Universal unit, *1177
Battleships, Electric equipment of. By H. A. Hormor, (D.) 654
Bells and chimes, Electric, in Woolworth building, *152
Belt, Safety screen protection against moving, *146
Binding post, Sloan improved type, *862
Blasting pole holes with dynamite, *905
Blowers, Sirocco, *49
Boiler feed water, Solid matter in, 1020
Boiler-room damper signal, *910
Boilers:
——Baffling arrangement with large combustion chamber, Detroit, Mich., *343
——Comparison of steam and energy outputs, Milwaukee, *754
——Economical operation of. By T. G. Coghlan, 625
——Explosion in Staten Island power plant, 829, 933
——Flameless combustion, Bonecourt process, 362
——Increasing output, 808
——Operation of 2365-hp. at Detroit, *1149
——Power station matters. By J. W. Jackson, 1173
——Reliability of very large boilers, 196
——St. Louis, Mo., Quick-firing arrangement to relay water power, *1170
——Scale and corrosion in, Prevention, (D.) 147; 808
——Soot and other deposits, Removing, *1336
Book reviews:
——Accumuladores Electricos. By Gaston Ossa, 1341
——Alternating Current Simplified. B. E. E. Burns, 705
——American Telegraph Practice. By Donald McNicol, 99
——Bau Grosser Elektrizitatswerke. By G. Klingenberg, 914
——Book of Standards, 46
——Common Battery Telephony Simplified. By Walter Atkins, 1175
——Cours D'Electrotechnique Générale et Appliquee. By R. Swyngedauw, 1230
——Cours de Physique Générale. By H. Ollivier, 971
——D'Este Steam Engineers' Manual, 1023
——Deutschen Uberland-Zentralen und Ihre Wirtschaftliche Bedeutung als Kraftquelle für den Kleinbetrieb in Landwirtschaft und Gewerbe. By Dr. Walter Strauss, 1126
——Electric Arcs. By C. D. Child, 99
——Electric Propulsion of Ships. By H. M. Hobart, 99
——Electric Vehicle Handbook. By H. C. Cushing and F. W. Smith, 1230
——Electric Wiring and Lighting. By C. E. Knox and G. E. Shaad, 346
——Electrical Engineering for Mechanical and Mining Engineers. By H. J. S. Heather, 1230
——Electrical Instruments and Testing. By N. H. Schneider, 971
——Elementary Treatise on Calculus. By W. S. Franklin, B. MacNutt and R. L. Charles, 861
——Engineering as a Profession. By A. P. M. Fleming and R. W. Bailey, 971
——Engineering Valuation of Public Utilities and Factories. By H. A. Foster, 248
——Examples in Applied Electricity. By C. G. Lamb, 914
——Funkentelegraphie, Die. By H. Thurn, 1175
——Grundlagen der Elektrotechnik. By A. Roth, 1283
——Handbook for Wireless Telegraph Operators Working Installations Licensed by His Majesty's Postmaster-General, 601
——Handbook of Wireless Telegraphy. By J. Erskine-Murray, 393
——Handbuch der Elektrizitat und des Magnetismus. Edited by L. Graetz, 914
——Hirsch Wilking Elektro-Ingenieur-Kalendar, 1913, 1283
——Illinois Public Utility Commission Law and Municipal Ownership Law. By W. J. Norton, 759
——Inspector and the Trouble Man. By S. A. Edwards and A. E. Dobbs, 759
——Masse und Messen. By Walter Block, 1283
——Motor and the Dynamo. By J. L. Arnold, 496
——Practical Alternating Currents and Alternating-current Testing. By C. F. Smith, 550
——Practical Electrician's Pocket Book for 1913, 150
——Practical Physics for Secondary Schools. By N. H. Black and H. N. Davis, 441
——Radium und die Radioaktivitat. By M. Centnerszwer, 1074
——Railway Signal Engineering. By L. P. Lewis, 971
——Regulations Governing Radio-Communication, 601
——Regulation of Municipal Utilities. Edited by C. L. King, 248
——Resuscitation. By C. A. Lauffer, 200
——Safety. By W. H. Tolman and L. B. Kendall, 759
——Science of Illumination. By Dr. L. Bloch, 1126
——Shop Mathematics. By E. B. Norris and R. T. Craigo, 811
——Sovratensioni negli Impianti Elettrici. By Emilio Piazzoli, 1074
——Télégraphie et la Téléphonie Simultanées et la Téléphone Multiple. By K. Berger, 46
——Telephone Erection and Maintenance. By Herbert G. White, 655
——Universal Electric Directory. By J. A. Berly, 298
——Wiring Diagrams of Electrical Apparatus and Installations, 46
——Year-Book of Wireless Telegraphy and Telephony, 1913, 99
Boston:
——Automobile salon, 937, *1044
——Electric Motor Car Club, Meetings, 576, 672
——Electrical contractors plan get-together meetings, 936
——Electrical development discussed at meeting of various interests, 1199
——Refusal to purchase municipal gas-lighting equipment, 5
Brackets:
——Boltless, Line Material Co., *915
——Concrete, Panama lock lighting, *240
Brickyards:
——Energy costs in electrically operated, 1112
——Savings with motor-operated clay excavator, *1162
Bridge with trolley-wire slack take-up, *909
British Association for the Advancement of Science, Annual meeting 618, 675
Brooklyn, N. Y., Post Office, Central-station service for, *541
Brush discharge with special reference to the generation of ozone. By A. Vosnaer, (D.) 969; Comment, 933
Brushes, Carbon:
——Selection and operation. By W. P. Poynton, 621
——Thin brushes give trouble, 1070
Bureau of Standards, Relation to national commissions. By E. B. Rosa, 941
Burners for oil (See Oil burners)
Busbar supports, Delta-Star high-tensoon, *973
Busbars, Current distribution in. By W. O. Schumann, (D.) 495
Bushing, Universal, New Process Specialty Co., *1076
Business outlook, 217, 1193, 1243

C

Cable clamp, Boltless self-tightening, *201
Cable hanger for mine service, Electric Service Supplies Co., *48
Cable pulling record, Panama Canal, 754
Cable-reel jack, Mullin, *1234
Cable supports and sleeves, Norris, *498
Cable supports for interior work, *291
Cable testing plant of Siemens-Schuckert Co. By Leon Lichtenstein, (D.) 247
Cables (See Wires, wiring and conduits)
Calculating machine, Ensign electric, *1127
California Commission news, 71, 175, 417, 577, 683, 835, 1099
California State Association of Electrical Contractors, Annual meeting, 461
California State Railroad Commission, Report of committee on inductive interference, 733; Comment, 723
Calorimeter bomb, Thermo-electric, (D.) *1282
Camera, Electrically operated slot-machine, Ashton-Wolff, *102
Canadian Conservation Commission opposed to private development at Long Sault, 272
Canadian Electrical Association, Convention, 9, 69, 183
Canadian Water-Power Commission, 168
Canal rays, Transmission of through thin partitions. By A. N. Goldsmith, (D.) 392
Cape Cod canal, Electric service, *376
Capital, Return must attract, 563
Car, Exhibition, of the Middle West Utilities Co., *188
Carbon electrodes, Use for scrap, 493
Carborundum refractories, Unique material. By F. J. Tone, (D.) 549
Carboy inclinator, McCord, *812
Carrier system for transporting mail or packages in tubes, 706
Catenary construction (See Transmission)
Caustic, Electrolytic production of. By J. B. C. Kershaw, (D.) 496
Cell, Burns-Boston improved primary wet, 152
Cellar drainer, Electric, *1233
Cement, Johns-Manville high-temperature, 760
Central-station business:
——Amherst, Mass., Current supply for Westfield, 847
——Appliance sales. By W. E. Robertson, 748
British experience, 1242
Denver, Col., *1014
Providence, R. I., 431
Sound merchandising principles. By W. G. Stetson, 627
Southern California Edison Company's method of allowing for old coffee pots and irons. By S. M. Kennedy, *1062
Truck an adjunct to campaign, Denver, 1112
——Arlington, Wash., Motor load campaign, 695
——Athens, Ga., Flatiron campaign, 592
——Automobiles (See Automobile business of central stations)
——Baltimore:
Development figures, 693
Load factor increase, 568
Real estate inquiry office, 237
——Boston:
Development increasing, 186
House-wiring campaign, *1013
——Boston Edison Co., 903
——Breakdown-service customers, Securing full-schedule business from, 1214
——Brooklyn, N. Y.:
Neighboring merchandising, *746
Opening of shop, *803
——Centralization of energy production. By Samuel Insull, 119
——Charges, Graphic illustration of, (D.) 440
——Chicago:
Co-operation with contractors, 724
Energy for surface and elevated lines. Terms of contracts, 1110; Comment, 1089
Public Service Co. of Northern Illinois, 336
Servant problem and electrical convenience, 237
Statistics concerning installations, 174
Washing machine contest, *485
——Chickasha, Okla., Electric pumping, 1161
——Complaint department, Operation of, Stockton, Cal., 37
——Complaints, Handling of. By D. B. South, 415

*Indicates illustrated articles.

Central-station business: (Continued)
——Co-operation of allied electrical industries. Discussion at New England Section of N. E. L. A., 627
——Co-operation with contractors, Chicago, 724
——Co-operation with the isolated plant, 113
——Co-operation with real-estate dealers, 113
——Co-operation with sales department. By S. M. Sheridan, 539; Comment, 511
——Co-operation with staff. By Thomas Chandler, 415
——Cost-keeping systems, Efficient, Portland, Ore., 1012
——Customers:
Dissatisfied, Retaining business of. By T. F. Kelley, 118
Relation of central station to, 137; By J. T. Shannon, 628
——Customers' records, Colored-tab system of, New Orleans, *695
——Dallas, Texas, Electrical Days, 882, 937
——Defiance, Ohio, Flatiron campaign, 1269
——Delinquent notices, Effect of courtesy in, 642
——Denver:
Appliance sale, *1014, 1112
Window lighting " on trial," 848
——Detroit, Mich.:
Building construction service, 1164
Sales departments "Readiness to Serve," 1012
——Developing and diversifying present load. By H. E. Armstrong, 232
——Diplomacy in rehabilitating a plant, 1324
——Elevator as a central-station load. By R. W. Charles, 1017
——Elwood, Ind., Washing-machine campaign, *641
——Fan service for the sick, 267, 336
——Fan sales:
Joliet, Ill., *87
St. Louis, Mo., *335
——Flatirons:
Athens, Ga., 592
Defiance, Ohio, 1269
Lansing, Mich., 959
Marion, Ind., Exchange sale, *592
St. Louis, "Iron by wire," 335
Saving soles with electric irons, 541
Southern California Edison Co. By S. M. Kennedy, *1062
——Fort Wayne, Ind.:
Revenue from the "turn-down" lamp, 1213
Tungsten lamp sales, 959
Use of electricity in tuberculosis campaign, *1221
——Fort Worth, Tex., Data, 592
——Franklin, Mass., Prizes for school essays, 431
——Hartford, Conn.:
Lamp renewal policy, 476
Truck battery interchange system on mileage basis. Rate schedules. Heating business, *473
——Hotel as a customer. By C. A. Collier, *432; Discussion, 428; Comment, 409
——Household uses of electricity, Forty-two, 36
——Houston, Tex., Renting tungsten fixtures, 591
——Indianapolis, Ind., 902
——Jackson, Mich., Utilizing grocery stores in percolator campaign, 1164
——Kokomo, Ind., 538
——Lansing, Mich., Flat-iron campaign, 959
——Lexington, Ky., Kentucky Utilities Co., Rural service, *1208
——Line extensions into sparsely settled territory, 901
——Line extensions, Principles governing. By A. Macomber, 626
——Load builders. By Milt Saul, 427
——Louisville, Ky.:
Inspection situation, 272
Merger, 21, 67
——Manchester, N. H., Wiring campaign, *1066
——Marion, Ind., Flatiron exchange sale, *592
——Minneapolis, Minn.:
Customers' Iinformation Book, 904
Increase of energy output, 87
——Minnesota, Rapid development in the Southern part, 1163
——"Movies" as a central-station load, New York, *137
——New business outlay and return, 1326
——New Orleans:
Customers' records, System of, *695
Tungsten-pendent campaign, *642
——New York, Wiring campaign, 91
——Noblesville, Ind., Rural lighting and motor-service, *749
——Oklahoma City, Co-operating to avert a water famine, 747
——Operator's rise to independence, 238
——Overtime electric drive for the laggard department, 432
——Pittsburgh's solution of small customer problem, 1215
——Portland, Ore., Cost-keeping system, 1012
——Providence, R. I.:
Combination appliance sales, 431
Employees' relations with the public, 137
——Pumping load development, 1326
——Relation of the central station to its customers, 137; By J. T. Shannon, 628
——Renewals of tungsten lamps, 166, 217, 220, 476
——Retaining business of dissatisfied customers. By T. F. Kelley, 118

Central-station business: (Continued)
——St. Louis, Mo.:
Fan sales, *335
"Iron by wire," 335
Office building service, 641
Reduced monthly minimum, Residence lighting, 431
Service code, 1329
——San Francisco, Kilowatt-hour costs of combination system, 238
——Service. By S. L. Coles, 70
——Small town service in Colorado, 1061
——Small towns, Problems in. By A. B. Marsden, 626
——Southern California Edison Company's method of allowing for old coffee pots and irons. By S. M. Kennedy, *1062
——Springfield, Mass., Refrigeration development, 1113
——Springfield, Ohio, Service extensions to bona-fide customers, 138
——Steubenville, Ohio, Financial results, 137
——Summit, N. J., Distributing prizes, *486
——Technical magazines and the small plant manager, 642
——Tungsten lamp situation, 217, 220, 457
——Washing machines, Novel method of introducing, 658
——Wiring:
Boston, House-wiring campaign, *1013
Free flatiron with contract, Chicago, 336
Free wiring in Gronau, Germany. By K. Eiler, (D.) 703
Losses from voltage drop. Co-operation with customer, 575
Manchester, N. H., *1066
New York, United Electric Light & Power Co., 91
Rental basis, Franklin, Mass., 237
——Worcester, Mass.:
Displaying connected motor-load, *641
Factory group adopts service, 1061
——Youngstown, Ohio:
Central-station service for Hotel Ohio, *1206
Electric shop, *1213
Use of electric truck, *1213
——(See also Advertising)
Central station practice:
——Alarm circuit for step-bearing accumulator, Marion, Ind., *965
——Alarm gong, Motor-driven, *1276
——Careless station wiring, 1297
——Centralization of energy production. By Samuel Insull, 119
——Changing two-phase generators for three-phase operation, Indianapolis, Ind., *755
——Chicago Commonwealth Edison System operating features. Sharing by schedule peak loads between three turbine stations. Work of load dispatcher in supervision and control, *633
——Construction-cost data, Tenney Companies in Massachusetts, 639
——Electricity as a by-product. By R. J. Spencer-Phillips, (D.) 1228
——Energy losses in a large system, *341
——Gas exhauster, Motor-driven, Mankato, Minn., *94
——Gas-lamp lighter for break-down service, Automatic, Marion, Ind., *856
——Great Britain, Centralization of energy supply. By C. Vernier, (D.) 1074; Comment, 1034
——Greenfield, Mass., Improvements, 335
——Headers to eliminate steam traps, Louisville, Ky., *493
——Hiring of apparatus. By T. C. Parsons, (D.) 810
——Ice-making (See Refrigeration)
——Interruptions of service, Method of decreasing, Marion, Ind., 707
——Labeling station apparatus, 361
——Louisville, Ky., Power plant repair complaint and work-order blanks, 1224
——Minneapolis General Electric Co., Book of regulations, 1060
——Oil engines, Diesel, in small stations (D.) 246
——Operating costs in steam plants. By H. G. Stott and W. S. Gorsuch, 18; Comment, 2
——Output, Percentage of unaccounted-for, 858
——Polyphase feeder-regulator motors operated from single-phase feeder circuit, Kansas City, *94
——Reconstruction of plant. Rearrangement of auxiliaries and economies effected, Hampton, Va. By A. R. Smith, *371; Comment, 362
——St. Louis, Mo.:
Preparation to receive Keokuk power, 195
Storage-battery control by counter-emf cells, *1267; Comment, 1242
——Sectionalizing devices. By F. Heppenstall, (D.) 198
——Shreveport, La., Rapid rehabilitation work, *195
——Silesian Gas & Electric Co., *1203
——Test lamps, Field excitation, *41
——Three-wire direct-current systems. By A. Lauteren, (D.) *439
——Ventilation of steam-turbine engine room. By E. Knowlton, (D.) 654
——Waterloo, Iowa. Steam plant and substation equipment. Records. Underground distribution system in business district, *177; Comment, 166
——Weatherford, Okla., Municipal ice electric plant, *430

Central-station practice: (Continued)
——Windsor, Vt., Supply of electricity to a manufacturing and rural community, *1153; Comment, 1141
Central stations:
——Amesbury, Mass., Extensions, Estimated cost, 547
——Auglaize Power Co., Auglaize River, Western Ohio. Low-head development. Generating and switching equipment, *891; Comment, 877
——Birmingham, Ala., Alabama Traction, Light & Power Co., Hydroelectric station on Coosa River and steam station at Gadsden, *527
——Bremen, Germany, (D.) 757
——Brookings, S. D., Cost figures. By E. M. Soreng, *1321
——Budapest, Municipal plant, 691
——Camden, N. J., Opposition to municipal plant, 271
——Cedar Rapids, Can., Construction work, 319
——Chicago:
Commonwealth Edison system operating features. Sharing by schedule peak loads between three turbine stations. Work of load dispatcher in supervision and control, *633
Effect of dark days on load curve, 1198
Fisk Street 1912 extension. Very large turbo-generators, including one 25,000-kw. from England, *787
Statistics of installations, 174
——Cincinnati, Contention over depreciation fund in attack on Cincinnati-Union lease, 6
——Connecticut River Transmission Co., *685, *737; Comment, 670
——Construction cost date, Tenney companies in Massachusetts, 639
——Coon Creek Rapids, Mississippi River, near Minneapolis, *1094
——Costs with water power, steam engines and steam turbines, Twin City Rapid Transit Co., 1049
——Deckerville, Mich., Plant wrecked, *1302
——Depreciation of, on the Pacific Coast. By Dr. Louis Bell, *379
——Double-deck, Passing of, *464
——East Haddam, Conn., Rehabilitating a small station, 289
——England:
Accrington Electricity Works, Gas-electric and by-product recovery plant, (D.) 495
Burton-upon-Trent, Extensions, (D.) 391
Island of Jersey, Proposed plant, (D.) 391
West Hartlepool, Waste heat for generation, (D.) 495
——Ft. Wayne, Ind., Passing of the double-deck station, *464
——France:
Review of hydroelectric plants. By E. duLongueval, (D.) 1021
Rouen, Nancy and Marseilles. By P. Bizet, (D.) 969
——German-Swiss water-power development at Rheinfelden. By E. Frey and O. Albrecht, (D.) 757, 810, 969, 1072, 1173
——Gorge (See below, Northern Ohio Traction & Light Co.)
——Greenfield, Mass., Improvements, 335
——Hales Bar, Chattanooga & Tennessee River Power Co., Completion of station after nine years of work, *997; Comment, 985; 1036
——Hampton, Va., Newport News & Old Point Railway & Electric Co., Reconstruction. Turbines displace engines. Economies effected. By A. R. Smith, *371; Comment, 362
——Holland, Statistics. By J. A. Schonton, (D.) 549
——Hot Springs, Ark., Fire, 522
——Ice troubles, 702
——India, Tata transmission plant supplying power for Bombay, *950
——Kentucky Utilities Co., *1208
——Keokuk, Ia., Mississippi River Power Co. By M. Nordenswan and C. W. Schmidt, (D.) 969, 1021
——Historical review on development, *462
——Opening of plant, 412
——Little Rock, Ark., Merchants' Lighting Co., Rapid erection of station. Condenser pit to accommodate varying river stages, *1101; Comment, 1089
——London electricity supply, (D.) 96
Lot's Road, (D.) 97
St. Marylebone, Financial report, (D.) 345
——Los Angeles, Cal., Developments by the Southern California Edison Co., 674
——Louisville, Ky., Louisville Gas & Electric Co., Waterside station:
Electrical equipment and switching apparatus. Special panels on switchboard. Use of colored wire. Work order system, *895
Turbine station. Condensing equipment below turbine floor. Labeling of the circuits, *837; Comment, 825
——Marion, Ind., Decreasing the duration of service interruptions, 797
——Montague City, Mass., Hydroelectric plant for Turner's Falls Power Co., 672
——Northern Ohio Traction & Light Co., Gorge steam station at Cuyahoga Falls. By J. C. Lathrop, *419; Comment, 410

*Indicates illustrated articles.

Central station: (Continued)
——Ogden, Utah, Opened valve wrecks plant, 938
——Pacific Gas & Electric Co., Drum station on South Yuba and Bear Rivers. By F. G. Mudgett, *1055
——Paris. By T. Pausert, (D.) 654
Northern and Southwestern stations. By J. Reyval, (D.) 703
——Power factor of German stations, Improving. By R. Nagel, (D.) 1339
——Profitable small station, Walton, N. Y., *323; Comment, 314
——Racine, Wis., Condensing water tunnels, 858
——Reconstruction. Displacing engines with turbines. Rearrangement of auxiliaries and economies effected, Hampton, Va. By A. R. Smith, *371; Comment, 362
——Redlands Cal., Depreciation of. By Dr. Louis Bell, *379
——St. Louis, Mo., Preparation to receive Keokuk power, 195
——Sault Ste. Marie, Mich., Edison Electric Co., Extensions of plant, 1109
——Shreveport, La., Rapid rehabilitation work, *195
——Silesian Gas & Electric Co., Upper Silesia, Germany, *1203; Comment, 1193
——Southern California Edison Co. By H. W. Dennis, *281
——Staten Island, Richmond Light & Railroad Co., Boiler explosion and service interruption, 829, 933
——Stettin, Germany. By Mayer, (D.) 1281
——Sweden:
Porjus waterfalls, (D.) 1281
Trollhättan plant, (D.) 1281
——Switzerland, Development at Biaschina. Utilizing 870-ft. head of Tessin River, to furnish energy for nearby electrochemical industries, *73
——Syndicate interests in. Statistical analysis of number of plants operated by holding companies or other controlling interests and by independent owners and municipalities, 482; Comment, 458
——Tacoma, Wash., Nisqually River development. By R. H. Richards, *227
——Tallulah Falls, Ga., Georgia Railway & Power Co., *1257, *1309; Comment, 1241, 1297
——Twin City Rapid Transit Co., Minneapolis. Development of generating system. Unit costs with water power, steam engines and steam turbines. Increasing efficiency, *1049
——Wakefield, Mass., Purchase of energy, 1037
——Walton, N. Y. Rehabilitation of system. Methods adopted to increase earnings and improve the efficiency of generation, *323; Comment, 314
——Waterloo, Iowa. Steam plant. Operating records. Underground distribution system, *177; Comment, 166. By Austin Burt, *386
——White Salmon River, Northwestern Electric Co., Portland, Ore. System. Woodstave pipe line. Electricity and steam heat for Portland. By W. B. Foshay, *275; Comment, 265
——Windsor, Vt., Supply of electricity to a manufacturing and rural community; *1153; Comment, 1141
——Winnipeg, Municipal plant shows deficit, 116
——Württemberg, Money value of systems and installations. By H. Klaiber, (D.) 297
Centralization of energy production, Sociological and industrial aspects of. By Samuel Insull, 119
——(See also Central-stations, Syndicate interests.)
Chair, Electric wheel, for San Francisco Exposition, *1284
Charging for electric energy:
——Austria. By A. Rosenbaum, (D.) 440
——Automobile rates. By J. F. Gilchrist, 885
City of 80,000 population, 902
Memphis, Tenn., 802
Rates in various cities, 746, 803
Toronto, Can., 801
——Chicago:
Discussion by City Council, 67, 727
Investigation by Commonwealth Edison Co., 21, 174
Negotiations, 990
Ordinance, 1144
Proposed reduction, 936
Report of City Electrician Palmer, 174
——Circular of Uniform Electric Rate Association, 673
——Cooking rate, Jacksonville, Fla., 1112
——Discussion. By P. R. Moses, 853; S. M. Kennedy, 1066; L. H. Conklin, 1167; Comment, 1141; C. M. Jansky, 1275
——Discussion by Pennsylvania Electric Association, 624
——England, the "Point Fives," (D.) 1124
——Flash-lamp cost of energy is $111 per kw-hr, 1209
——Flat rate and a current limiting device. By A. T. Holbrook, 428
——Free renewal policies, 220; Comment, 217
——Going value as basis, 1300
——Graphic illustration of rates, London, (D.) 440
——Hartford, Conn., Codification of rates, 474
——Heating rates, Hartford, Conn., 475
Charging for electric energy: (Continued)
——Monopoly and the rate discrimination, Opinion of L. D. Brandeis, 826
——Optional rates. By F. A. Newton, 681
——Regulation, Two epochs of. By W. J. Norton, 414; Comment, 410
——Relation of surplus to rate-making. By F. E. Barker, 942; Comment, 933
——Two-rate schedule without time-operated control. By H. H. Perry, (D.) *1173
Charging for steam heating, Experience of Western town, 593
——Uniformity in rate making desirable, 721
Chicago:
——Building trades strike settled, 170
——Central-station energy for surface and elevated railways. Terms of contracts. Economies effected, 991, 1110; Comment, 1089
——Commonwealth Edison Co.:
Annual dinner, 991
Protest against city's valuations, 21, 462
——Consolidation of the Commonwealth Edison and Cosmopolitan Electric companies, 364
——Contractors, Registration of electrical, 121
——Department of Electricity, Reorganization of, 222
——Electric rate investigation, 21, 67, 122, 174, 727, 772, 936, 990, 1045, 1144
——Electric vehicle situation in 1913, 992, 1196
——Electrolysis ordinance, 888, 1045
——Fires, Electrical, 220
——Inspection bureau, Electrical, 991
——Merger of gas and electric properties reported, 617
——Registration of contractors and municipal inspection, 1064
——Sanitary district, Electrical development, 140
——Street lighting and the shortage of water power, 1033
——Street railway underground-contact system proposed, 120
——Telephone conditions, 223, 224
——Terminal electrification, 4, 1148
Report of B. J. Arnold, 1044
——Vacuum cleaning for schools, 1329
——Wiring and illumination of Continental and Commercial National Bank building, *189
Chick hover, Electrically heated, *919
Chickens:
——Electric light increases number of eggs laid, 1330
——Reduced mortality among ozonized, 746
Chlorine, Electrolytic production of. By J. B. C. Kershaw, (D) 496
Choke coils, Calculation of. By R. Edler, (D.) 969
Church, Motor application in, Worcester, Mass., *693
Cinders, Apparatus for catching, 568
Circuit breakers:
——Basis of breaking capacity rating of oil circuit breakers. By J. N. Mahoney, (D) 1072
——Developments. By J. N. Mahoney, (D) 600
——Oil, for high potentials. By K. C. Randall, 630
——Sangamo shunt-trip, for battery-charging service, *1024
Circuit protection. By P. M. Lincoln, 568
Circuits, Arcless interruption. By F. Kraus, (D) 860
Cleveland:
——Bonds for municipal plant held valid, 672
——Crippled by blizzard, 988
Clinkering, Sulphur as a cause of, 858
Clip, Heavy-duty test, Mueller, *1285
Coal:
——Efficient utilization. By W. S. Burstall, 618
——Report on coals of United States, 1120
——Selecting samples for calorimeter test, 42
——Storage, Subaqueous, Indianapolis, *592
——Utilization versus waste, 675
——Value, Determining. By E. Boernstein, (D) 1124
Coal and ash handling equipment at Pacific mills, South Lawrence, Mass., Motor-driven, *1178
Coal breaker, Electric, 1328
Coal dust in air, Influence of the presence of gas upon the inflammability of. By W. N. Thornton, (D) *970
Coal elevators, Electrically operated inclined, on Ohio River, *597
Coasting time recorder, Rico, *1128
Coffee pot, Electric percolator, Westinghouse, *497
Coil, Science and art of the Pupin, 1325
Coils, Insulation of electromagnetic. By B. Duschnitz, (D) 1227
Colorado Electric Light, Power and Railway Association, Convention, 727
Colorado public utilities commission bill, Petition against, 122
Commutation:
——Repulsion motors. By M. Liwschitz, (D) 390
——Theory. Experimental investigation. By A. Mauduit, (D) 599
——Theory of the neutral zone. By M. Latour, (D) 390; C. L. R. F. Menges, (D) 439; K. Pichelmayer, (D) 599
Commutator armature, Emfs induced in. By Alfred Winkler, 1021
Compensators, Two classes of rotary. By G. H. Eardley-Wilmot, (D.) *1281
Complaints (See Central-station business)
Compressor for cupola-furnace, 1276
Compressor for garage use, Jacobsen Machine Mfg. Co., *1076
Condenser-current method for the determination of alternating wave-form. By Frederick Bedell, *378; Comment, 361
Condensers:
——Discharge of through inductive circuit. By J. A. Fleming, (D) 392
——Energy losses in condensers used in high-frequency circuits. By L. W. Austin, (D) 44
——Measurements influenced by use of imperfect tinfoil contacts. By G. E. Bairsto, (D) 247
Conduit fittings:
——Appleton, *812
——Concrete, Chicago Fuse Mfg., Co., *1075
——National Metal Molding Co., *1075
Conduits (See Wires, wiring and conduits)
Conservation conference in Albany, 1300
Construction contracts, New York City and Interborough Rapid Transit Co., 167
Contacts between bad conductors, Theory of. By W. H. Eccles, (D) 861
Continuity, presidential address by Sir Oliver Lodge, 614 (D) 704
Contractors:
——Co-operation with, Chicago, 724
——Cost keeping for. By F. L. Decker, 172
——Wiring guaranteed. By Ernest McCleary, 171
——Wiring guaranteed, Proposal in Great Britain, 1
Control equipment for Panama Canal locks, *1317
Controllers:
——Cutler-Hammer elevator, *864
——Leonard patent, *318
——Monitor automatic alternating-current, *1026
——Waterproof, for rock drill, Ward-Leonard, 972
Converters:
——Combination rotary converter and synchronous motor, Northwestern Electric Co., *709
——Power factor effects of rotary. By N. Stahl, (D.) 1338
——Rotary, Power factor limitations. By J. L. McK. Yardley, (D) 911
——Self-synchronizing. By Dr. E. Rosenberg, 218
Cooking, Electric:
——Comparison of electricity and gas, Salt Lake City, 636
——Cost of one year's cooking. By J. T. Morris, 643; Comment, 615
——English earthenware devices, *760
——Experience in Twin Falls and Pocatello, Idaho, 187
——Fireless cooker, Hotpoint Electric Heating Co., *397
——Hattiesburg, Miss., Mississippi State Normal School, *431
——Jacksonville, Fla., Two-cent rate, 1112
——Nashville, Ill., 35
——Newton, Mass., *35
——North German Lloyd company, Bremen. By W. Schulz, (D) 297
——One cent a meal, 746
——Range for hotel service, *917
——Standardization of apparatus, Recommendations of the English society. "The Point
——Unity-load-factor range, Test with, 849
Fives," 66
——Value of a cooking load. By R. B. Mateer, 1270
——Winnipeg, Ranges in, 1272
Co-operation for business expansion (See Society for Electrical Development)
Copperclad steel infringement case, 68. By P. H. W. Smith, 244
Copper compound for attaching brush leads to brushes, 656
Copper ore, Smelting in electric furnace. By D. A. Lyon and R. M. Keeney, (D.) 704
Copper refining, Electrolytic, Great Falls, Mont. By W. T. Burns, (D.) 654
Cord holder for electric iron, Paragon, *974
Corona:
——Dielectric strength of air and corona. By F. W. Peek, Jr., 85
——Losses. By Weidig and Jensch, (D.) 96
——Losses in three-phase lines. By Georges, (D.) 246
——Oscillographic study of. By E. Bennett, *86
——Precipitation and positive and negative corona. By W. W. Strong, 85
——Pressure, Effect of, on formation. By J. B. Whitehead and T. T. Fitch, 85
Cost of producing electrical energy. By H. M. Hobart, (D.) 703
Costs of energy in steam plants. By H. G. Stott and W. S. Gorsuch, 18; Comment, 2
Country districts (See Agriculture, Electricity in)
Crane electro-magnets, Turbine generator for, Brown, *1286
Cranes, Wellman-Seaver-Morgan electrically operated pontoon, *1078
Cream separator, Diehl motor-driven, *442
Crematory at Detroit using electric blower, *1215
Credits and collections discussed by electrical business men, Chicago, 1046
Cross-arm for maintaining alignment, *1117
Cross-arms (See Poles)
Crossings, Overhead:
——Illinois rules, 39
——Protective loop, Dayton, Ohio, *240
Currency bill, 1301

*Indicates illustrated articles.

D

Damped oscillations, Oscillographic demonstrations of. By G. Meller and M. Pozaryski, (D.) 247
Damper signal for boilers, *910
Dams:
——Conchos River, Mexico, Work stopped, 364
——Fremont, Ohio, Additions, 223
——Hales Bar station of Chattanooga & Tennessee River Power Co., Difficulties in building, 998
——Tallulah Falls, Ga., *1258
Delta rays, Experimental investigation. By H. A. Bumstead, (D.) 549
Derrick for erecting heavy poles, Matthews, *498
Diagrams, Direction of advance in, 771
Dielectric fatigue, Nature of. By W. Holttum, (D.) 345
Dielectric forces, Residual. By K. F. Wagner, (D.) 1125
Dielectric properties of non-conductors. By Phillips Thomas, (D.) 758
Diesel engine, Danger of starting, with compressed oxygen, 1020
Digging holes in frozen grounds, Use of gasoline, 754
Discharge from wires, Force required to produce. By J. S. Townsend, (D.) 44
Discharges, Arc and spark, Electrodynamics of. By Arthur Szarvassi, (D.) 1021
Disinfectant, Hypochlorite, Use of in England, (D.) 392
Disinfecting books with an electric blower, 36
Display panels for wall fixtures, *1117
District of Columbia Commission news, 1098
Distribution. (See Transmission.)
Distribution of energy in the spectra of gases. By H. L. P. Jolly, (D.) 1339
Distribution rack made of iron pipe, *545
Diversity factor, Meaning of, 967. By C. W. Brown, 1119, 1122; (D.) 1338
Doherty holding companies, Consolidation, 1247
Drills, Motor-driven:
——Francis Reed Co., *710
——Independent Pneumatic Tool Co., Ball and roller bearings, *974
Drives, Electric. (See Industrial plants.)
Dumbwaiter elevator mechanism, Diehl direct-drive, *201
Dumbwaiters, Electric, Burdett-Rowntree, *604
Duplex Metals Co., versus Standard Underground Cable Co., 68
Dynamometers:
——Astatic electro. By J. T. Irwin, (D.) 1229
——Torsion. By H. Goerges and P. Weidig, (D.) *149
Dynamos. (See Generators.)

E

Eddy current, 1335
Edison companies' sales managers, Convention, 268
Education:
——Employees' scholarships, Brooklyn Edison Co., 825
——**Engineering,** Discussions by Society for Promotion of Engineering Education, 12
——**Industrial,** Discussion by American Institute of Electrical Engineers, 17
——Statistics of graduates from electrical courses in the United States, 775
——Training of electrical engineers. By H. Faraday Proctor, (D.) 1126
Electric energy, Cheap, would solve many social and economical problems of population and traffic, 721
Electric field distribution. By W. S. Franklin, (D.) 297
Electric shock and execution. By J. P. Langlois (D.) 46
Electric Vehicle Association of America:
——Chicago section, 727, 773
——Convention at Chicago, 617, 673, 885, 919, 960, 1216
——New England section, 1045
——New York section, 617, 1249
Electric vehicle operators, Proposed training school for, 727
Electric vehicles. (See Automobiles, Electric; Trucks, Industrial.)
Electrical code of New York, Ruling on service requirements, *1065
Electrical Congress. (See Panama-Pacific International Exposition.)
Electrical Credit Association of Chicago, Annual meeting, 1046
Electrical Credit Association of New York, Annual meeting, 1197
Electrical engineers:
——Incomes of graduates, 476
——Statistics concerning graduates in the United States, 775
——Training of. By H. Faraday Proctor, (D.) 1126
——Vocation of. By E. W. Merchant, (D.) 1126
Electrical industry:
——Census records of 1909, 881
——Development discussed at Boston, 1199
——Discussion at Association Island, Henderson Harbor, N. Y., 316
——Future development. By C. P. Steinmetz, 515
——(See also Society for Electrical Development)
Electrical securities. (See Financial.)
Electrical Manufacturers' Club, Annual Meeting, 989
Electrical Supply Jobbers' Association:
——Convention, 512
——November meeting, 1037
Electricity as a present-day necessity, 509
Electricity from refuse, 424
Electro-analysis of copper alloys. By J. G. Fairchild, (D.) 98
Electrodes for arc lamps:
——Carbon and impregnated, Composition, manufacture and life of. By A. T. Baldwin, *793; Comment, 771
——Rondal patent, (D.) 757, 809
Electrodynamometer for heavy currents. By P. G. Agnew, (D) 45
Electrolysis in sockets and electrical fixtures, 436
Electrolytic corrosion of iron in soils. By B. McCollum and K. H. Logan. 16
Electrolytic iron in the construction of electric machines. By Max Bresslauer, (D.) 43, 147; Comment, 113; E. von Mauthner, (D.) 548; Moellinger, (D.) 655
Electromagnets:
——Attraction of an armature by. By J. Bethenod, (D.) 969
——Calculation of. By G. Schlee, (D.) 247
——Design and use of magnets. By B. E. Fernow, 622
——Efficiency of the electromagnet. By L. Schuler, (D.) 1174
——Ferro-cobalt for. By Pierre Weiss, (D.) 345, 1022
Electrometer, Benndorf self-recording. By J. Patterson, (D.) 150
Electrons, Experimental proof that the electric current in metals is best carried by. By O. W. Richardson, (D.) 495
Electrostatic valve. By O. Steels, (D.) *600
Elevator as a central-station load. By R. W. Charles, 1017
Elevator controller parts cabinets, *553
Elevator equipment of the Woolworth building, New York City. By C. E. Knox, *125; Comment, 114
Elevators, Development of passenger. By E. F. Tweedy, (D.) 297
Empire State Gas and Electric Association, Annual convention, 729
Employees:
——Accident prevention, Inland Steel Co., Chicago, 341
——Arbitration of difficulties by public service commissions, 985
——Desirability of publicity in labor disputes, 115
——Merit system for salesmen and solicitors, St. Louis, 337
——Profit-sharing plan of Brooklyn Edison Co., 1197
——Public service commissions as arbitrators, 985
——Relations with the public, Providence, R. I., 137
——Roller skates in storerooms, New Bedford, Mass., *432
——Safety suggestions on pay envelopes, 1277
——Schools, Brooklyn Edison Co., 825, 955
——Welfare work:
Boston Edison Co., 830
Discussion by Pennsylvania Electric Association, 623
Engineering education:
——Discussions at Society for Promotion of Engineering Education, 12
——Training of electrical engineers. By H. Faraday Proctor, (D.) 1126
Engineers. (See Electrical engineers.)
Engines:
——Ball & Wood heavy service, 387
——Improving high-speed. By W. H. Wakeman, *242
——(See also Gas engines; Oil engines.)
England. (See Great Britain; London.)
European electrical matters. By Louis Bell, 1054
Excavator, Motor-driven drag-line, *1162
Exhibit booth, Portable, New Orleans, *434
Exhibit car of the Middle West Utilities Co., *188
Exhibits at state fairs, Electrical, 694
Explosion of boiler in Staten Island power plant, 829, 933
Explosions caused by electric heating of bitumen in cable troughs. By W. N. Thornton and J. A. Smythe, (D.) 601
Export trade, 61, 561, 1193
Eye. (See Light.)

F

Fans, Electric:
——Advertising perfumes by means of, 484
——Application of, to drive fly chasers, 87
——Bootblack's use of, 593
——Disinfecting attachment, Spray Ozone Co., *152
——Free service for the sick, 267, 336
Feed cutter, Motor-driven, saves liveryman $170 a month, 1115
Feed water of boilers, Solid matter in, 1020
Feeder protection, Waters patent, (D.) 97
Feeder regulators, Economies. By A. D. Fishel, 624
Financial:
——Bonds as collateral security for short time loans, New Jersey Board of Public Utility Commissioners, 877
Financial: (Continued)
——Electrical securities: "Saturating the dollar with energy." By Samuel Insull, 939
——Holding companies, Where they may lead, 1195
——Interest rates for electric capital, 671
——Needs of the electrical industry. By F. A. Vanderlip, 534; Discussion, 516; Comment, 510
——Return must attract capital, 563
Fire alarm service:
——Electric vehicle in emergency, Huntington, W. Va., 289
——Knight system. By E. E. Moore, (D.) 298
——Telephonic system, Ephrata, Pa., *249
Fire alarms, Electric. By W. Fellenberg, (D.) 706
——Dafan apparatus. By J. Simey, (D.) 811
——German systems, (D.) 1229
Fire extinguisher, Johns-Manville, *1342
Fireless cookers, (See Cooking, Electric)
Fires:
——Chicago, Electrical fires for year, 220
——Hot Springs, Ark., Power station, 613
Flame arc lamps (See Arc lamps)
Flameless combustion, Bonecourt process, 362
Floods at Houston, Tex., 776
Floor receptacle and junction box, Lutz-Webster Engineering Co., *1077
Floor scrubber, Electric rotary, Finola, *1026
Flywheels, Prevention of oil-throwing, *1169
Folding machine, Electric, American Folding Machine Co., *706
Formulas for capacity of single-phase transmission lines and cables. By C. A. Pierce and F. J. Adams, *327; Comment, 315
Fountain, Electric, without water connections, *918
Franchise report of National Municipal League, 1043
Free renewal of lamps. (See Charging for electric current)
Frequency changers:
——Operation of. By N. E. Funk, 20
——Need of, and types. By Harris and Bonnett, (D.) 1338
Fuel. (See Coal; Oil)
Fuller board in electrical machinery, Use of, 1020
Furnaces, Electric:
——Copper ore smelting. By D. A. Lyon and R. M. Keeney, (D.) 704
——Design, Characteristics and commercial applications. By W. McA. Johnson and G. N. Sieger, (D.) 600, 758, 970, 1229
——Heroult, Cal., Iron-ore reduction. By John Crawford, (D.) 98
——Pinch-effect furnace. By Carl Hering, (D.) 247
——Platinum tube furnace. By R. E. Slade, (D.) 149
——Present status. By W. Sykes, 683
——Resistor type, for ore reduction. By F. Louvrier, (D.) 1229
——Stassano steel furnace at Redondo, Cal. By E. N. Schmelz, (D.) 1175
——Steel refining. By O. Frick, (D.) 654; J. Harden, (D.) 758
——Zinc smelting. By T. Louvrier, (D.) 970
Furnaces, Oil-burning, Design of. By R. T. Strohm, *1018
Fuses:
——Carbon-tetrachloride, Delta-star, *442
——Cost of refillable. By R. C. Patton, 40.
——Metropolitan repulsion type, 1179
Fusing currents for copper wire, 493
Future electrical development. By C. P. Steinmetz, 515

G

Galvanometers:
——Ballistic, Theory. By T. J. I'a. Bromwich, (D.) 247
——Design of vibrating. By H. F. Haworth, (D.) 44
Gamma rays from radium D and radium E. By E. Rutherford and H. Richardson, (D.) 600
Gas, A new. By Sir Joseph Thomson, 675
Gas battery, Grove, Features of. By Karl Siegel, (D.) 1175
Gas-lamp lighter for break-down service. Automatic, Marion, Ind., *856
Gas meters, Electrically operated, Waterloo, Ia., *840
Gas velocities, Electric measurement of, Goldschmidt method, (D.) *200
Gas engines:
——Cooling by coarse spray. By B. Hopkinson, (D.) 495
——Fuel and lubricants for. By B. H. Arnold, (D.) 969
——Japan, Kawaski Dockyard Co., (D.) 345
——Valveless, Producers' Supply Co., *250
——(See also Oil engines)
Gas exhauster, Motor-driven, Mankato, Minn., *94
Gas producers, Installation of suction, Rules for, 702
Gasoline cars. By L. C. Joseph, 884
General Electric Co., Strike at Schenectady works, 1096, 1147
Generating plant for foreign use, Kewanee, *1075
Generators:
——Air filters, British, (D.) 859

*Indicates illustrated articles.

Generators: (Continued)
——Air filtration, cooling and ventilation, Wet system. By J. Christie, (D.) 96
——Alternators, Theory of. By J. Lisner, (D.) 1227
——Armature mmf relations in synchronous machines. By J. H. Morecroft, *1106
——Automobile lighting system, Kouyoumjian, *606
——Calculating alternating-current machines. By M. Boucherot, (D.) 1021
——Central pole dynamo, (D.) *968
——Chicago, Fisk Street station, 25,000-kw unit, *787
——Commutating-pole saturation. By Harold Stokes, 18
——Commutation, Sparkless, Deri patent, (D.) 245
——Design of, for silent operation. By S. Pontecorvo, (D.) 968
——Developments of high-frequency alternators for wireless telegraphy, (D.) 859
——Direct-current machines with interpoles. By Oskar Szilas, (D.) 1227
——Distortion in direct-current, Predetermining the effect of. By Alfred Hay, (D.) 1172
——Double-commmutator machines. By Karl Pichelmeyer, (D.) 968
——Electrolytic iron for. By Max Breslauer, (D.) 32, 147; Comment, 113
——Explosion of a turbo-generator, Trieste, (D.) 653
——Failure to generate due to many causes, 1334
——Fire hazard in turbo-generators. By G. S. Lawler, 1200
——Goldschmidt alternating-current, Theory. By T. R. Lyle, (D.) 859
——Half-speed operation, 389
——Heat tests, Short. By W. R. Cooper, (D.) *809
——High-frequency alternator for radio-telegraphy. By Bouthillon, (D.) 968; Comment, 934
——High-speed, Design of. By M. Leblanc, (D.) 296
——Insulating and grounding. By Terrell Croft, *908, *965
——Lightning troubles, 1226
——Parallel operation of alternators, 95
——Parallel operation and the use of amortisseurs. By P. Boucherot, (D.) 1227
——Parallel operations with different characteristics, British patent, (D.) 1072
——Phase compensation. By V. A. Fynn, *28, *75, *132
——Progress in manufacture. By M. Leblanc, (D.) 197, 296
——Standardization rules, German, (D.) 757
——Synchronous, Armature mmf relations. By J. H. Morecroft, *1106
——Synchronous and non-synchronous reactance. By J. Rezelman, (D.) 703
——Thermometer chart for turbo-generators, *145
——Turbo-generators for marine use, Diehl-Terry, *48
——Unipolar machine, Present status. By C. Trettin, (D.) 43
——Upper Silesia, 20,000 kva, (D.) 911
——Ventilation. By J. C. Brighton, 11
——Ventilation of turbo-generator, Water-spray filter, *94
——Voltage variation in compound-wound, 1168
German Association of Central Stations, (D.) 1341
German Association of Electrical Engineers, Annual meeting. By Zehme, (D.) 346; (D.) 441, 495
German Illuminating Engineering Society, Report of. By Warburg and Liebenthal, (D.) 245
Germany, Electricity in. By Buggeln, (D.) 549
Glands for bulkheads, Water-tight, Metal Jointing Co., *100
Glasgow, Exhibition of electrical appliances, 268
Gloves, Reversible electricians, 813
Government publications, How to obtain, 967
Graduates. (See Electrical engineers)
Graphic instruments, Design of. By K. Edgecumbe, (D.) 1022
Graphical statics applied to transmission-line calculations. By Alfred Still, *230; Comment, 219
Graphite:
——Metallized, for bearings and collector brushes, 920
——Resistance of. By D. E. Roberts, (D.) 199
Graphometer, Chicago Electric Meter Co., *153
Gravity, Theory of. By S. B. McLaren, (D.) 1174
Great Britain:
——Heating and lighting, Electric. By. Dr. Louis Bell, 413
——Motor buses in London, (D.) 860; 956
——Municipal Electrical Association, Convention at London, 11
——Municipal electrical enterprise. By A. Briton, 1205; Comment, 1194
——Railway officials of England study electrification in the United States, 1149
——Railway statistics. By A. J. Lawson, (D.) 439,600
Greenhouses, Electric drives in, Chicago, *841
Grinders, Motor-driven:
——Besly double-spindle, *864
——Forbes & Myers double-disc with wheel guards, *602
——U. S. Electric Tool Co. double-disc, *154
Ground clamps:
——Belcher, *972
——Forbes, *1180
Ground connections, Protective, German regulations. By G. Ruppel, (D.) 1072
Grounded-star versus isolated-delta systems viewed from experience in the southwest. By C. W. Rice and S. Thomson, (D.) 912
Grounding, German rules, (D.R.) 97
Grounding motors and generators. By Terrell Croft, *908
Grounding to water mains in arid districts, Texas, 963
Grounds and open circuits on series arc systems, Locating, *806
Grounds in armatures, Method of locating, *295

H

Hair waver and drier, Electric, Slaughter, *603
Head-lamps:
——Basic principles of illumination relations. By C. R. Sugg, *741; Comment, 722
——Design of light sources. By A. R. Dennington, *742; Comment, 722
——Fundamental principles of illumination. By L. C. Porter and K. W. Mackall, *141; Comment, 115
——Performance of incandescent. By L. C. Porter, *744; Comment, 722
Heating, District:
——Costs under average conditions, Easton, Pa., 849
——Flat rates, Double fallacy of, Experience of Western town, 593
——Metered versus flat-rate service, 88
——Portland, Ore., Northwestern Electric Co. By W. B. Foshay, *275; Comment, 265
——Small city problems. By H. C. Kimbrough, 784
Heating, Electric:
——Advantages. By P. Bizet, (D.) 969
——Cost for one year. By T. J. Morris, 643; Comment, 615
——Design, Construction and operation of devices. By H. O. Swoboda, 831
——Dubilier heating apparatus, *1233
——Efficiency and cost. By H. O. Swoboda, (D.) 549
——England, Conditions in. By Dr. Louis Bell, 413
——Hartford, Conn., Low rates, 475
——Hotel data, Comparison with steam heating. By C. A. Collier, *432; Discussion, 428; Comment, 409
——Industrial. By T. King, 568
——Nickel-plated and costly appliances, 538
——Repair of heating element, 1070
Heating pads, Electric, *1233, *1285
Heavy electric traction. (See Railways.)
Hetch Hetchy bill passed by Congress, 1196
High potential disturbances, Report at Association of Edison Illuminating Companies, 567
High voltage engineering. By F. W. Peek, Jr., (D.) 1338
Hoists, Electric:
——Largest mine hoist in the world, (D.) 599
——Pawling & Harnischfeger, *866
——Thomas Elevator Co., *350
——Used as scraper, St. Paul, *300
Holding companies, Where they may lead, 1195
Horse-power versus the watt, 1
Horticulture, Electric lighting in, 770
Hospital, Electric service, Salida, California, 138
Hotel as a central-station customer. By C. A. Collier, *432; Discussion, 428; Comment, 409
——Southern hotel. Data, 1270
——Youngstown, Ohio, at Hotel Ohio, *1206
House number, Electric-lighted, 1015
Human skin, Sensitiveness of, as a detector of low-voltage alternating-emfs. By H. Stansfield, (D.) 811
Hydroelectric developments:
——California, Truckee River General Electric Co., 775
——Connecticut River, 1244
——Fort Snelling, Public use of energy from, 121
——Keokuk, Ia., Celebrating inauguration of plant, 412
——Klameth River project below Keno, Ore., *1105
——Load factor of plants, 756
——Mexico, Conchos River dam, Work stopped, 364
——Montana. By Max Hebgen, (D.) 439
——New Hampshire situation, 317
——Pacific Light & Power Corporation, Los Angeles, Cal., 116
——Pend d'Oreille River, International Power & Mfg. Co., Federal permit for development, 333; Comment, 313
——Sault Ste. Marie, Canadian investigation, 272
——Washington, Development on Skagit and Cascade rivers, 936
——(See also Central stations)
Hygrometer, Recording, Industrial Instrument Co., 1129
Hysteresis and eddy-current losses in transmission towers, Pacific Light & Power Cor., Los Angeles, Cal., *1108; Comment, 1091

I

Ice loading on transmission lines, Effects of. By V. H. Griesser, 629
Ice-making. (See Refrigeration.)
Illinois Commission news, 994, 1306
Illinois public utilities law, 4, 5, 678
Illinois State Electric Association, Annual meeting, 678
Illuminating Engineering Society:
——Buffalo convention with International Congress on School Hygiene, 464; Comment, 459
——Chicago section, 831
——Officers, 64
——Philadelphia section, 881
——Pittsburgh meetings, 5, 168, 269, 564, 619, 676, 1245
Illumination. (See Lighting.)
Illumination chart. (See Lighting, Calculation.)
Inaccuracies in textbooks. By Brother Potamian, 1221
Incandescent lamp fixtures:
——Adjustable fixture for control of light distribution, Cutter, *762
——Arrow porcelain pull-socket, *1024
——Guard for interurban cars, *487
——Hanging device, Electro Development Co., *915
——"Hamstring" switch, *488
——Hospital dust-proof units, *498
——Indirect units with detachable bowls, National X-Ray Reflector Co., *443
——Johns-Manville bracketless semi-indirect wall fixtures, *1078
——Outdoor, Line Material Co., *499, *707
——Pass & Seymour, Temporary receptacle, *394
——Portable holder, Luminous Unit Co., *862
——Pottery. Fulper, *100
——Protection from falling lamps and reflectors, *1274
——Reflector for bulletins and signs, Reynolds, *444
——Reflector for out of doors, Line Material Co., *1076
——Reflectors, Effectiveness and efficiency of various types, Facts and figures concerning. By G. H. Stickney and A. L. Powell, 477; Comment, 459
——Transformer-reflector, Campbell, *347
Incandescent lamps:
——Anniversary of birth, 769, *773
——Boron-tungsten compound for filaments, Hansen-Mohr patent, (D.) 296
——Development. Scales of lamp values. By M. von Pirani, (D.) 390
——Double-filament. By A. Barth, (D.) 439
——Efficiency as expressed in watts per candle, 1035
——Fluctuations of candle-power of alternating-current. By G. W. Meyer, (D.) 147
——Gas-ignition hazard, 910
——Graphitized carbon filaments, British patent, (D.) 911
——Half-watt, Development and construction. By R. Ziegenberg, (D.) 1173
——High-efficiency with tungsten filament and inert gas, General Electric Co., 116
——Improvements. By Ward Harrison and E. J. Edwards, 619
——Industrial lighting. (See Lighting.)
——Leading-in wires:
Cooling effect of. By T. H. Amrine, 619
English patent, (D.) 810.
Hermetically sealing. Substitute for platinum. By G. B. Burnside, (D.) *245; Comment, 217
——Manufacturing data. By H. D. Erb, (D.) 1338
——Metallic filament:
British patents, (D.) 703, 810
Hansen and Mohr patent, (D.) 43
Kast patent, (D.) 1228
Life, of as affected by inclosing globes. By G. Sunden, (D.) 703
Progress, 409
Versus the flame of lamp. By J. Schmidt (D.) 1173
——Mine, Portable, Specifications for. By H. H. Clarke, 1165
——Nitrogen-filled tungsten:
Brilliancy and aid in good lighting, 1142
Development of. By Irving Langmuir and J. A. Orange, *798; Comment, 770
German, *1130; By K. Mey, (D.) 1281
Rating and consumption, 628
——Osram lamp with ductile tungsten. By H. Remane, (D.) 43
——Prices in Great Britain, (D.) 911
——Projector lamp with uniform candle-power distribution, *919
——Proper use of. By F. T. Benson, 679
——Regeneration of. By E. A. Krueger, (D.) 43
——Renewals of tungsten lamps free, 166, 217, 220, 476
——Report at Association of Edison Illuminating Companies, 514
——Sealing wires in glass, British patent, (D.) 96
——Temperature of filaments, Method of determining. By Lummer, (D.) 245
——Testing box, *1269
——Testing problems. By P. S. Miller and L. J. Lewinsohn, 883

*Indicates illustrated articles.

Incandescent lamps: (Continued)
——Tungsten:
Application of inert gas under pressure, 265
Breakage reduced, 805
British patents, Various, (D.) 147
Commercial outlook, 457
Development. By J. W. Howell, 620; A Lederer, (D.) 1072
German patents, (D.) 1227
Half-watt, 514. By R. Ziegenberg, (D.) 1173
Leiser drawn wire, (D.) 1071
Ludecke and Brimsdown patent, (D.) 599
Nitrogen-filled. (See above.)
Pope drawn filament, (D.) 1123
Rating of, Report of the British National Physical Laboratory, 63
Schwarzkopf and Burgstaller patent, (D.) 911
Tests by British engineering standards committee, (D.) 43
(See also Street lighting.)
——Veteran lamp. By Theodore Thiele, *964
Independent Telephone Association of America, 1094
Indiana Electric Light Association, Convention, 564, 679
Indiana Public Service Commission:
——Informality of proceedings, 831
——News, 466, 577, 735, 835, 889, 945, 994, 1047, 1151, 1201
——Practice of, 169
Indianapolis merger situation, 524
Indianapolis strike, 985
Indicators showing condition of screens in condensing water intake, *700
Inductance and capacity, Comparing. By W. E. Forsythe, (D.) *98
Inductive interference. (See Transmission lines.)
Industrial education, Discussion at American Institute of Electrical Engineers' convention, 17
Industrial lighting. (See Lighting.)
Industrial plants, Electricity in:
——Automobile engine factory, Detroit, Mich., *1327
——Automobile factory, General Vehicle Co., Long Island City, Battery-room wiring. By T. W. Poppe, *850
——Brick plant savings with motor-operated clay excavator, *1162
——Brickyards, Energy costs, 1112
——Cost analysis of drive in a foundry, 537. By F. T. Leilich, 596
——Cost of motor-drive in six-story factory, 381
——Electricity as a by-product. By R. J. Spencer-Phillips, (D.) 1228
——Greenhouse drives, Chicago, *941
——Horsepower defined. By Albert Milmow, 427
——Lonsdale Co., Lonsdale, R. I., Lighting plant, *639
——Machine shop drives. By Charles Fair, 780
——Newspaper plant, Alternating-current drive. By A. B. Spaulding, *239
——Newspaper plants, Kentucky, 847
——Pea-vining plant operated from central-station line, Wallace, Mich., *801
——Printing motors, (D.) 1124
——Railroad shops, Macon, Ga., Discarding isolated plant, *485
——Rolling mill arranged according to Ilgner-Leonard principle. By C. Hahn, (D.) 246
——Rubber industry, Motor-drive in. By C. A. Kelsey, 18
——St. Louis, Stove manufacturer's testimonial, 1162
——Silesia Gas & Electric Co., Electric supply for mills and factories, *1203
——Stationery factory, Electric drive in, *1113
——Steel mills, Motor drive for main rolls. By Brant Wiley, 682
——Sugar manufacture. By P. S. Smith, (D.) 297; W. S. Scott, (D.) 1124
——Water-meter factory, *694
Industrial research, Credit to, 877
Industrial survey by the National Civic Federation, 936
Inspection, Electrical:
——Chicago bureau, 991
——Kentucky towns, 936
Instability of electric circuits. By C. P. Steinmetz, 938
Instruments, Design of graphic. By K. Edgecumbe, (D.) 1022
Insulating material:
——Asbestos wood, Johns-Manville, *603
——Commutator insulation for replacing built-up mica, *761
——Dielectric strength of thin. By F. M. Farmer, 1250
——Micarta, Westinghouse, *103
——Testing, German rules, (D.R.) 98
Insulating motors and generators. By Terrell Croft, *908, *965
Insulation problems. By W. S. Franklin, (D.) 297
Insulation resistance. By S. Evershed, (D.) 1282, 1340
Insulators:
——Calculating strength of overhead lines. By P. Gesing, (D.) 1282
——Evolution of American high-tension insulators. By F. W. Curt Brecht, (D.) 1228
——High-tension, Requirements for. By A. Martin-Saxton, (D.) 860
——Porcelain strain, Westinghouse, *301, *1286
——Resinous, British patent, (D.) 914
——Suspension Defects of, 410
Insulators: (Continued)
——Suspension-insulator patent case, Decision, 985, 988
——Testing outdoors, 1337
——Testing specifications for high-voltage. By F. W. Peek, Jr., and J. A. Sanford, Jr., 84
——Wirt drawn-steel pipe, *1342
Internal combustion engines. (See Gas engines; Oil engines.)
International Association of Municipal Electricians, Convention, 414
International Congress of Refrigeration, Proceedings, 630, 848
International Electrical Congress at San Francisco, 1915, 1301
International Electrotechnical Commission, Meeting, Berlin, Germany, 412, 570; Comment, 562
International Exposition of Safety and Sanitation, German exhibit, 222
International Photometric Commission, Berlin convention, 511, 519
Interest rates for electrical capital, 671
Interstate Commerce Commission, Telephone operation records requested, 316
Invention, Electrical. By E. P. Thompson, 194
Inventors' Guild, Resolution on patent reform, 270
Investment Bankers' Association of America, Annual convention, 936
Ionization:
——Columnar, Investigation of. By E. W. Wellisch and J. J. Woodrow, (D.) 758
——Ionization by charged particles. By Norman Campbell, (D.) 98
——Ionization in gases and gaseous mixtures by Roentgen and electronic radiations. By C. G. Barkla and A. J. Philpot, (D.) 97
——Oscillations and. By Barton and Kilby, (D.) 1074
——Positive, from heated platinum. By Sheard and Woodburv, (D.) 1073
Ions:
——Absorption of heat produced by emission of ions. By H. L. Cooke and O. W. Richardson, (D.) 704
——Ions from hot salts. By O. W. Richardson, (D.) 704
Iron:
——Electrolytic, in the construction of electric machines. By Max Bresslauer, (D.) 43, 147; Comment, 113; E. von Mauthner, (D.), 548; Moellinger, (D.) 655
——Lead coating for iron and steel, Cowper-Coles process, (D.) 811
——Magnetic properties of sheet iron, Effect of vibrations on. By E. Gumlich and W. Steinhaus, (D.) 703
Ironing, Electric, in shirt-waist factory, *88
Irrigation:
——Montana project, 880
——Pumps, Motor-driven. By H. B. Walker, 783
——Richmond, Cal., 1060
Isolated plants:
——Boston, Filene store. Lighting and motor service, *579
——Co-operation of isolated plant and central-station, 113
——Discarding plant, Macon, Ga., *485
——Substitution of central-station service, Advantages. By P. M. Lincoln, 782
Italy, Electrical industries in, (D.) 495

J

Jack boxes, Cordless, Western Electric, *1284
Japan electrical industry. By A. A. Brandt, (D.) 1341
Jovian order:
——Baltimore, Officers, 1036
——Chicago rejuvenation, 1245
——Convention in New York, 724, 769, 777
——Galveston, Tex., Celebration, 576
——Progress of. By E. C. Bennett, 143
——St. Louis, Mo., 725
Junction box for location at 90-degree angles, *552

K

Kansas Electrical Contractors' Association, Convention, 772
Kansas Gas, Water, Electric Light & Street Railway Association, Convention, 522, 783
Kardiograph, Electro-, Siemens-Halske. By J. Rautenkrantz, (D.) 1023
Kelvin memorials:
——Belfast, *67
——Westminster Abbey, (D.) 248
Kerosene engines. (See Oil engines.)
Kilovolt-ampere and kilowatt, Meaning of, 295
Kilowatt-hour and demand meter, Combined, (D.) *298
Kilowatt-hour costs of combination system, Analysis of, Pacific Gas & Electric Co., 238
Kuhn products, Collapse of, 61, 64

L

Labor. (See Employees)
Laboratory and testing room of Siemens-Halske-Schuckert Cable Works, (D.) 1229
Lamp circuits, Regulation of, 808
Lamp guards for gymnasium, *39
Lamps, Electric. (See Arc lamps; Incandescent lamps.)
Lamps, Portable, Fulper pottery, *100
Lathe, Motor-driven damper, *658
Laundry drying, Electric, 139
Legal:
——American Can Company, Suit against, under Sherman law, 1148
——American Telephone & Telegraph Co., Government suit against, 221; Comment, 218. By R. L. Lunt, 340; T. N. Vail, 365; 1092
——Copper-clad steel infringement case, 68. By P. H. W. Smith, 224
——Copyright-book prices, Supreme Court decision, 1146
——Fessenden wireless patents upheld by Court of Appeals, 939
——Fixing resale prices, 1300
——High-tension transmission line not dangerous, Virginia decision, 774
——Interlocking directorates not illegal, 1244
——Municipal gas-lighting equipment, City refuses to purchase, 5
——Patents, Foreign co-invention, Effect of, on validity of domestic patent, 66
——Steam turbine, Blade cover, Sectional, Decision upholding Emmet patent, *992
——Suspension-insulator patent case, Decision, 985, 988
——Utah Power & Light Co., 880, 1248
——Valuation and rate making, Minnesota and Missouri cases, 21
——Wireless patents suits, 1098
Lettering a lighting cabinet, *805
Light:
——Color values of light from electric-lamp sources, Use of spectro-photometer. By L. Bloch, (D.) *1172
——Daylight and artificial, Difference between, 1091
——Electric arc as a standard of light. By J. E. Forrest, 691; Comment, 669
——Eye, Efficiency of. By C. E. Ferree, 620
——Eye and its absorption of radiant energy. By M. Luckiesh, *844; Comment, 827
——Monochromatic comparison of lights of different colors. By M. Von Pirani, (D.) 1172
——Pentane lamp as a working standard. By E. C. Crittenden and A. H. Taylor, 677
——Point sources, Visibility of, 266
——Production, Theory of. By W. A. Darrah, 620
——Protection against ultra-violet light, 95
——Psychological values of light and color. By F. P. Lewis, 620
——Reduction of, for photometric purposes. By Martens, (D.) 245
——Selenium as a detector of. By E. E. F. d'Albe, (D.) 247
——Standard, Electric arc as, using carbon electrodes. By J. F. Forrest, (D.) *494
——Units of light. By Brodhun, (D.) 245
——Visual acuity in white light. By M. Luckiesh, 1160; Comment, 1142
——X-rays as light. By C. G. Barkla, 618
Lighting, Electric:
——Automobile salesroom, Boston, *1330
——Automobiles. By J. Loewy, (D.) 549
——Bank building in Chicago, *189, *863
——Building entrance, Use of quartz-tube lamps, *752
——Calculation, Chart for rapid, from known values of candle-power and of vertical and horizontal distances from the source. By N. S. Dickinson, *586
——Cars:
Indirect lighting, 315, 1016
Postal car tests, Baltimore & Ohio R. R., 90
Relative merits of various systems, 879, 883
Requirements. By H. Ward Leonard, 1041
Tungsten lamps. By S. G. Hibben and E. M. Smith, (D.) 96
Economy. B. S. G. Hibben, 619
Reflectors and tests. By L. C. Porter and V. L. Staley, 1042
Storage battery. By Wilcke, (D.) 197
——Church. By R. B. Ely, 752
Westminster Abbey (D.) 390
——Circus outfit, *250
——Cleveland art loan exhibition, *1332
——Daylight and artificial light, Difference in conditions, 1091
——Discussion at Buffalo convention of the Illuminating Engineering Society and the International Congress on School Hygiene, 464; Comment, 459
——England, Conditions in. By Dr. Louis Bell, 413
——European and American lighting developments. By H. W. Jackson, A. Maxwell, S. G. Rhodes and C. F. Lacombe, 1043
——European cities, Wide use of tungsten and flame-arc lamps. By Louis Bell, 637
——Eye as a judge of uniform illumination. By J. R. Cravath, 1118
——Factory. By M. H. Flexner and A. O. Decker, 676
Cambridge, Mass., Gray & Davis, *1064
Jackson, Mich., 1268
——Frosting on lamps, Effect of. By W. T. MacCall, (D.) 911
——Glassware, Service characteristics. By V. R. Lansingh, 677

*Indicates illustrated articles.

Lighting, Electric: (Continued)
——Head-lamp illumination. By C. R. Sugg, *741; A. R. Dennington, *742; L. C. Porter, *744; Comment, 722
——Hospital. By W. S. Kilmer, 620
——Hotel-room illumination, *1015; By H. D. Austin, 1333
——Hotel Ohio, Youngstown, Ohio, *1207
——Indirect, Test of efficiency by A. L. Avenberg and R. E. Fischel, *50
——Indirect and semi-indirect defined, 42
——Indirect and semi-indirect, Practical application. By J. R. Cravath, 415; L. V. James, *905
——Industrial lighting by incandescent lamps, Requirements in shops and factories. Operating data. By Ward Harrison, *1001; Comment, 987
——Intensities of natural and artificial light required for reading. By J. R. Cravath, 38
——Inverse square law in illumination, 1337
——Jeweler's push-button advertising lighting scheme, 1219
——Luxury of the electric light. By E. Schneider, (D.) 296
——Mixing colors in light versus colors in pigments. By Bassett Jones, 1166
——Motorcycle lighting, (D.) 296
——Office building, Lytton, Chicago, *27
——Physics of lighting. By F. L. Bishop, 1200
——Polo field illumination, 236
——Postal-car Tests on Baltimore & Ohio R. R., 90
——Primer of Illuminating Engineering Society, 412
——Railway station, Germany, (D.) 549
——Restaurant, Columns at entrance, *699
——Schoolroom, Discussion at Buffalo convention, 364, 464
——Schools and libraries, Investigation by the British Illuminating Engineering Society in co-operation with other societies, (D.) 345; Comment, 313
——Search-lantern on observation car, *640
——Semi-indirect units, Types and uses of. By L. V. James, *905
——Steel mill. By C. E. Clewell, (D.) 44; W. Harrison and H. H. Magdsick, 682
Data from thirty plants on use of incandescent lamps, 906
——Stores:
Boston, the Filene establishment. Indirect illumination and special display, *579
Equipments in New York City. By C. L. Law and A. L. Powell, 751
Showcase, *487
Showcase for plate-glass door, *38
Show window. By H. B. Wheeler, 677
Value of proper lighting, *698
——Street. (See Street lighting.)
——Substation, New York City, Indirect, *605
——Swimming pool, St. Louis, *541
——Tennis courts, *90, *383
——Theater, London, *962
——Voltage variation in the operation of systems, Causes of. By J. J. Sullivan, (D.) 296
——Westminster Abbey, (D.) 390
Lightning arresters:
——Aluminum, New form, (D.) 913
——Concrete resistor for, *541
——Electrolytic, Construction, installation and performance. By G. C. Dill, (D.) 600
——European and American practice. By E. E. F. Creighton, (D.) 297, 495
——Location of. By J. L. Buchanan, 678
Lightning flashes, Peculiar. W. Kohlrausch, (D.) 758
Lightning protection:
——Cripple Creek district, 1015
——German report. By S. Ruppel, (D.) 46; Comment, 615
——Protective effect of straight vertical rod. By Sir Joseph Larmor, 618
Lightning troubles at generators, 1226
Line construction. (See Transmission of electrical energy.)
Linemen's gloves and safety belts, 702
Liquid air, Electric conductivity imparted to, by alpha rays. By McLennan and Keys, (D.) 1282
Load indicator for boiler rooms, Louisville, Ky., *807
Locomobiles:
——Operating results with Buckeye-mobile, 1279
——Present status of. By W. H. Miller, *326
——Uniflow cylinder adapted to. By W. H. Miller, *689
Locomotive head-lamp. (See Head-lamps.)
Locomotives, Electric:
——Alexanderson single-phase, General Electric Co., *731; Comment, 722
——Alternating-current, combination single-phase and polyphase, Norfolk & Western Ry., 367, *674
——Freight, Prussian State Rys. By R. Richter, (D.) 390
——High-voltage direct-current, Canadian Northern Ry., 729
——Loetschberg railway for Simplon Tunnel route. Single-phase, 15,000-volt, 15-cycle, 2500-hp units, *1009; Comment, 986
——Mine, Largest ever built, Carnegie Coal Co., *862
——Mittenwald Ry., Design of locomotives for mountain railways. By E. Seefhlner and F. Popp, (D.) 860
Locomotives, Electric: (Continued)
——Split-phase. By E. F. W. Alexanderson, (D.) 912
Lodge, Sir Oliver, on continuity, 614
Logging by electricity. By E. J. Barry, 630
London:
——Electricity supply, (D.) 96
——Motor bus situation, (D.) 860, 956
——Traffic in 1912. By A. J. Lawson, (D.) 1022
——Transportation and lighting. By Dr. Louis Bell, 366
Long Acre Light & Power Co., Decision, 122
Los Angeles, Cal., Co-operative plan of electrical distribution proposed, 989
Louisville utilities merger, 121
Lytton building. (See Office buildings, Chicago.)

M

Machine shop drives. (See Industrial plants.)
Machine tools, Designing for the ultimate consumer, 409
Magnetic control, Alternating-current and direct-current. By M. A. Whiting, 621
Magnetic field of the earth, Determining the horizontal intensity. By W. A. Jenkins, (D.) 1126
Magnetic field, Action of, upon electric discharge through gas. By L. T. Moore and G. J. Mauchly, (D.) 654
Magnetic fields, Measurement of, by their damping effect upon a vibrating coil. By P. E. Klopsteg, (D.) 1125
Magnetic properties of alloys. By G. Goldberg, (D.) 440
Magnetic testing and electric strain, Comment on paper by A. Campbell and H. C. Booth, 825
Magnetic tests. By F. Goltze, (D.) 704
Magnetic tests, Errors in, Due to elastic strain. By A. Campbell and H. C. Booth, (D.) 912
Magnetic tests of sheet iron. By K. Zickler, (D.) 861
Magnetism, New theory of. By S. B. McLaren, (D.) 913
Magnets. (See Electromagnets.)
Maine Commission news, 123
Maine public utility bill, 272
Manhole accident, Rochester, N. Y., 435
Maryland Commission news, 175, 321, 834, 1154, 1254
Massachusetts, Legislation in 1913, 23
Massachusetts Institute of Technology:
——New building, 990
——Research bureau established, 116
Massachusetts Public Service Commission, news, 23, 175, 224, 273, 466, 734, 785, 835, 889, 944, 994, 1151, 1254
Mathematics, Pure, in the scientific world. By H. F. Baker, (D.) 759
Measurement of peak voltage. By H. A. Morss, 136
Measurement of speed, Close. By N. M. Hopkins, 136
Measurements, Alternating-current, Use of the synchronous commutator. By Frederick Bedell, (D.) 970
Measuring frequency of wireless telegraph current. By Mandelstam and Papalexi, (D.) *199
Measuring gradient of slopes, Electric method for. By B. Audran, (D.) *601
Measuring machine for proving standard gauges, Electric. By P. E. Shaw, (D.) *346, 913
Measuring magnetic susceptibility, Magnetometer method. By W. H. F. Murdoch, (D.) *758
Mercury-arc rectifiers:
——Iron tube in place of glass. By H. F. Perkins, (D.) *548
——Physical phenomena underlying operation of. By F. P. Coffin, (D.) 1021
Mercury thread, Potential difference to pass electric current through. By H. K. Onnen, (D.) 654
Mercury-vapor apparatus, Starting method, New. By J. S. Anderson, (D.) 859
Mercury-vapor converters, Capacity and efficiency. By M. LeBlanc, (D.) 296
Mercury vapor lamps:
——Alternating-current, Darmois and LeBlanc patent, (D.) 96
——High-pressure, British patent, (D). 439
——Quartz-tube. By W. A. D. Evans, 621, 622
Merit system. (See Employees.)
Metals, Passivity of, (D.) 1229
Meter tester, Care in selection of. By C. B. Stelle, 138
Meter testing outfits, Flash-lamp attachment, 1060
Meter testing table, Johns-Manville, *151
Meters, Electric:
——Daily reading. By F. B. Culley, 429
——Failure of polyphase to operate, 1337
——Graphic. Experience and methods in Toronto. By G. D. Gratton, 183
——Installation of customers', 1122
——Moving coil, Westinghouse, *350
——Open-delta-connected circuits, 243
——Testing, Cost of periodic, Springfield, Ohio. By Weare Parsons, 434
Meters, Slip, for induction motors, Horschitz, *444
Meters, Speed, for automobiles, Siemens-Halske, (D.) 912
Metric system, Step toward. By Everett Morss, 293. By W. A. Del Mar, 490
Mexico, Hydroelectric project on Conchos River, Work stopped, 364
Michigan Commission news, 1099
Milking cows by electricity, Portland, Ore., *693
Mines, Electricity in:
——Blasting by electricity to reduce miners' phthisis, 1337
——Cannock Chase colliery, England. By S. F. Sopwith, (D.) 549
——Coal mines in Great Britain. By W. H. Telfer, (D.) 1173
——Cour d'Alene district. By J. B. Fisken, (D.) 439
——Cologne lignite industry, Development of. By R. Rinkel, (D.) 968
——Illinois, O'Gara coal mine in Sangamon County, Electric drive in, *1211
——Moravian Ostrau. By J. Havliack, (D.) 1021
——South African mines. By J. W. Anson, (D.) 147; (D.) 757
——Upper Silesia mines, Development of power in. By W. Vogel, (D.) 703; *1203
Mining operations, Effects on street railways and buildings. By Nolden, (D.) 1072
Minnesota public utility bill proposed, 272
Missouri Electrical Contractors' Association, Convention, 119
Missouri Public Service Commission:
——Issue with Nevada Water, Light & Traction Co., 1037, 1297, 1301
——News, 577, 889, 1047
Molecules, Constitution of. By A. C. Crehore, (D.) 148; N. Bohr, (D.) 704
Monel metal, Composition of, 438
Montreal Electrical Show, 1042
Moscow Electrical Congress, (D.) 970
Motor buses, Status of, in England, (D.) 860, 956
Motor meters, Holden-Chamberlain-Hookham patent, (D.) 811
Motor service and the N. E. L. A. By H. P. Stratton, J. B. McCall, 1119; C. S. Dawson, 1333
Motor starters:
——Effect of power factor on, 493
——General Electric direct-current, 760
——Multiple lever, British Westinghouse, *762
——Oil-immersed drum-type, British Westinghouse, *299
Motor support for overhead drive, Diehl, *301
Motor vehicles. (See Automobiles; Trucks, Industrial.)
Motorcycles, Electric self-starters for, 1024, *1231
Motor switch connections, Three-phase, *1334
Motors, Electric:
——Alternating-current, Electric Machinery Co., *446
——Alternating-current commutator, British patent, (D.) 1172
——Alternating-current commutator, New. By A. Heyland, (D.) *344; Comment, 314
——Alternating-current commutator machines, Operation of. By Niethammer and Siegel, (D.) 1071
——Combination of a commutator with an induction. By P. Ehrmann, (D.) 197
——Commutation, Sparkless, Deri patent, (D.) 245
——Commutator armature, Emfs induced in. By Alfred Winkler, (D.) 1021
——Compensated polyphase, Bell, *1286
——Designing installations for improved power-factor, *1334
——Electrostatic, Principles of. By Eugene Bloch, (D.) 1021
——Heyland alternating-current commutator. By A. Heyland, (D.) *344; Comment, 314
——Induction:
Modified design, Durtnall and Binyon, (D.) *1123
Slip meter for, Horschitz, *444
Westinghouse improved, *202
——Insulating and grounding. By Terrell Croft, *908, *965
——Lincoln squirrel-cage, for elevators and hoists, *814
——Mountain railway, Direct-current shunt motors. By Reutener (D.) 198
——Noiseless running of. By S. Pontecorvo, (D.) 1071
——Overload due to lack of lubrication, 1223
——Phase compensation. By G. H. Eardley-Wilmot. (D.) *1281
——Polyphase feeder regulator, operated from single-phase feeder circuit, Kansas City, *94
——Polyphase series, Methods of phase compensation and of insuring stable operation. By J. Jonas, (D.) 757
——Power-factor effects of railway motors. By N. Stahl, (D.) 1338
——Power factor of three-phase, Difficulty of determining. By P. Sauvage, (D.) 197
——Repulsion, Commutation. By M. Liwschitz, (D.) 390
——Rotor resistance and torque, 1277
——Self-excitation of saturated polyphase commutator-type series machines. By A. Scherbius and H. A. W. Klinkhamer, (D.) 1227
——Self-synchronizing. By Dr. E. Rosenberg, 218
——Single-phase, New. By A. Heyland, (D.) *344; Comment, 314
——Single-phase commutator for railways. By E. F. W. Alexanderson, (D.) 703
——Single-phase commutator. Mathematical investigating method. By J. Lissner, (D.) 494
——Single-phase, two-phase confusion, *1276
——Speed regulation, British patent, (D.) 1073

*Indicates illustrated articles.

Motors, Electric: (Continued)
——Speed regulation of induction. By F. W. Meyer, (D.) 494
——Starting traction motors. By Conrad Iranyi, (D.) 1228
——Submersion during flood, Uninjured, Danville, Ill., 207
——Synchronous:
Industrial uses. By J. C. Parker, *82
Lake patent, (D.) 1174
Measuring phase difference. By W. Tolwinski, (D.) 1227
Starting of Physical phenomena. By F. D. Newbury, 82
Motors and converters, Advantages of utilizing, for improving the power factor in alternating current systems. By H. L. Wallau, 1057; Comment, 1035; W. S. Culver, 1275
——Three-phase commutator, Types of. By Rüdenberg, (D.) 296
——Three-phase commutator, for driving machines in steel mills. By Schoenburg, (D.) 147
——Three-phase induction, Correct connections for. By E. Richter, (D.) *1124
——Three-phase series commutator, Self-excitation phenomena. By Scherbius and Sonnenschein, (D.) 1021
——Trouble with short-circuited slip rings, 1019
——Two-phase motor connections, *1223
——Unbalanced phases, 1280
——Undulating currents, Operation of direct-current motors by. By L. Barbillion, (D.) 197
——Universal motor for both alternating and direct current, 1226
——Ventilated induction, U. S. Electrical Mfg. Co., *761
Moving picture as targets for marksmen, 206, *302
Municipal ownership:
——Budapest electric plant, 691
——Kansas cities reject condemnation proceedings, 272
——Relative merits of municipal and private operation in England. By A. Briton, 1205; Comment, 1194
——Statistics, 482
Myriawatt as the boiler-horse-power. By H. G. Stott, W. D. Weaver, 92

N

National Civic Federation, Report on model public utility bill, 1199, 1248
National Conservation Congress, Washington, D. C., 880, 988, 1039
——Action on water power question, 1096; Comment, 1090
National Electric Lamp Association, Activities of the physical laboratory. By E. P. Hyde, (D.) 296
National Electric Light Association:
——Accident prevention committee, 1092
——Brooklyn Company section, 1197
——Commercial section, 316, 672, 829, 1092
——Convention of 1914 at Philadelphia, 269
——Executive committee meetings, 270, 774, 1196
——Michigan section, Convention, 271, 415
——Motor service, Attitude toward. By H. F. Stratton, J. B. McCall, 1119; C. S. Dawson, 1333
——New England section, Convention, 462, 626
——New York section, Lake George convention, 512, 574
——Public policy committee, 1036
——Southeastern section, Macon convention, 368, 427; Comment, 361
National Electrical Contractors' Association, Annual convention, 65, 171
National Municipal League, Franchise report, 1043
National Physical Laboratory, Work of, (D.) 98, 149, 199
Neon-vapor lamp. By Georges Claude, 616, 621, (D.) 1123
Networks. (See Transmission)
Nevada Public Service Commission news, 1254
New Hampshire Commission news, 834
New Hampshire hydroelectric situation, 317
New Jersey Public Utility Commission:
——News, 577, 1099, 1254
——Regulations for utilities, 888
New York canals, Hydroelectric energy on, 991
New York City:
——Battery-driven street cars, 1326
——Construction contracts, Interborough Rapid Transit Co., 167
——Electrical Expositon and Motor Show, 673, *776
——Long Acre Company wins, 1300
——Safety conference, 1196
——Safety exposition, 222, 1244
——Transportation problems discussed by Frank Hedley, 7
——Woolworth building, Elevator equipment, safety features, generating plant and wiring. By C. E. Knox, *125; Comment, 114
New York Edison Co., Commercial school, 881
New York electrical code, Ruling on service requirements of, *1065
New York Electrical Credit Association, Annual meeting, 1197
New York Public Service Commission:
——Appointments to, By Governor Sulzer, 114
——News, 23, 71, 123, 175, 273, 321, 369, 577, 683, 944, 1151
Newark N. J., Public Service Gas Company appeals Utility Commission decision, 316
Newspaper plants. (See Industrial plants)
Niagara River, Submerged weir for, 68
Nisqually River development, for Tacoma, Wash. By R. H. Richards, *227
Nitrogen, Use of oxygen in the fixation of, 672
Nitrogen-filled lamps. (See Incandescent lamps)
Nomenclature, Confusion in, 670
Non-conductors, Dielectric properties of. By Phillips Thomas, (D.) 758
Northwest Electric Light & Power Association, Convention, 366, 523

O

Office appliances, Electricity for, 606
Office buildings:
——Chicago, Lytton Building, Electrical equipment, *25
——Department store service, Stern's New York, *952
——Milwaukee, Electrically-operated machinery, 792
——New York City, Woolworth building, Electric equipment. By C. E. Knox, *125; Comment, 114
——St. Louis, Service controlled from building a block away, *336
Ohio Commission news, 123, 175, 369, 785, 1254
Ohio electric light and power properties, Assessed value of, 616
Ohio Electric Light Association, Annual convention, 65, 117, 232
Ohm defined, (D.) 1282
Ohm's law, Where it does not hold. By W. F. G. Swann, (D.) 1125
Oil:
——Handling, sampling and testing transformer oil. By G. E. Armstrong, *1322
——Removing moisture from, 1020
Oil burners. By R. T. Strohm, *342, *437
——Installation of. By R. T. Strohm, 1120
Oil-burning furnaces, Design of. By R. T. Strohm, *1018
Oil engines:
——Advantages in central stations. By F. L. Weakly, 785
——Diesel:
Small central stations, (D.) 246
Use of oxygen with. Report by G. S. Taylor on explosion in British station, (D.) 810; Comment, 1020
——Fuel and lubricants for. By B. H. Arnold, (D.) 969
——Fuel consumption of 450-hp Diesel-type, 910
——German two-cycle, *761
——Kerosene engine, Test of. By H. D. Wile, *389
Oil fuel for steam boilers. By R. T. Strohm, *700
——Cleaning of. By R. T. Strohm, *545
——Pumping and heating. By R. T. Strohm, *650
——Requirements for efficient burning. By R. T. Strohm, *145
——Spraying methods. By R. T. Strohm, *491
——Storage of. By R. T. Strohm, *1277
Oil pumping costs reduced by motor drive, San Joaquin, Cal., 1061
Old Time Telegraphers and Historical Association, Annual meeting, 460
Ontario Hydro-Electric Power Commissioners, Salaries for, 1244
Operating records, Waterloo, Iowa, 180
Optophone, Reading. By E. E. F. d'Albe, (D.) *1023
Oregon Commission news, 994
Oscillating electric circuits, Mechanical model of coupled. By E. W. Marchant, (D.) 811
Oscillations from direct-current, Method for producing. By W. I. Book, *393
Oscillograph, Cathode-ray. By H. H. Broughton, (D.) 1126
Oscillograph, Electrostatic, for recording very high voltages. By H. Hoe and S. Koto, (D.) 1175, *1340
Outlet box support during construction, *435
Outlet terminal, Condenser type. By C. Fortescue and J. E. Mateer, (D.) 654
Oven for japanning conduit, *813
Overhead construction. (See Transmission)
Ozone, Manufacture and uses of. By A. Vosmaer, (D.) 1175
Ozone machines and public health. By W. A. Sawyer, H. L. Beckwith and E. M. Skolfield, 993; C. P. Steinmetz, 1093; Comment, 1089; W. H. Thompson, 1333
Ozone water-purifying apparatus, American, *1231

P

Package-tying machine, Motor-driven, *656
Painting small objects, Spray method for, 1180
Panama Canal:
——Control equipment for locks, *1317
——Lock control board, Demonstration of, 220
——Lock lighting, Concrete brackets, *240
——Transmission line construction, Side-bracket 44,000-volt, *241
Panama Canal Zone, Power distribution systems, 1095
Panama-Pacific International Exposition, 1915:
——Electric service, 412
——Electrical Congress, 828
——Engines at, 222
Panama-Pacific International Exposition, 1915: (Continued)
——Foreign exhibit, Law for protection, 825, 829
——Lighting, 804
——Technical congresses, 168
Parcel post and electric delivery, 165
Patent matters:
——Foreign co-invention, Effect of, on validity of domestic patents, 66
——German legislation, 413
——Inventors' Guild, Resolution of, 270
——Legalized blackmail—A sample of ignorant patent legislation. By L. H. Backland, 1146; Comment, 1141
——Liberal patent system favored by F. P. Fish of Boston, 571; Comment, 563
——Oldfield intringement bill, 1245
Peace and Publicity, 115
Peak voltage, Measurement of. By H. A. Morse, 136
Pendulum, Precision. By K. Siegel, (D.) 1341
Pennsylvania Electric Association, Annual convention, 461, 512, 565, 623
Pennsylvania public utilities law, 4, 113, 120, 220, 272
Periodic curves, Analysis of. By S. Silbermann, (D.) 705
Phase balancer for single-phase loads on polyphase system. By E. F. W. Alexanderson, (D.) 1339
Phase compensation. By V. A. Fynn, *28, *75, *132; G. H. Eardley-Wilmot, (D.) *1281
Phase meter, German electrodynamic. By K. Grunn, (D.) 758
Phase-rotation indicator, Delta-Star portable, *48
Phase-transforming systems, Merits and early history of. By W. T. Taylor, *647
Photoelectric effect from metals. By Compton and Richardson, (D.) 1073
Photometers:
——Flicker. Experiments with irises of eyes paralyzed. By H. C. Stevens, (D.) 197
——Satori, for measurement of light distribution. By M. Schanzer, (D.) *653
——Spectra, Advantages and disadvantages. By G. A. Shook, (D.) 758
Photometry:
——Errors in. By E. J. Edwards and Ward Harrison, 751
——Photo-electric cell in. By F. K. Richtmyer, 691
Pipe:
——Resistance of iron, 1171
——Wood-stave, White Salmon river hydroelectric plant. By W. B. Foshay, *275; Comment, 265
Pipe lagging, Combination asbesto-sponge, Johns-Manville, *974
Planing machine, Newton motor-driven rotary, *973
Plant growth, Forcing of, by means of electricity. By H. G. Dorsey, 770, *1217
Plate straightening machine, Hilles & Jones, *1232
Platform support for oil switches, *856
Plug attachments:
——Cutler-Hammer split, *249
——Tregoning, *201
Plugs, Hotpoint Electric Heating Co., *445
Poles:
——Calculation of, for lines with suspension insulators. By Hans Gruenholz, (D.) 440
——Combination lighting and trolley, Niagara Falls, *204
——Concrete, for distribution lines, *1335
——Concrete, integral with building to save space, *543
——Creosoting wooden. By R. Novotny, (D.) 860
——Erection with motor truck reduces cost, *1011
——Impregnated, behavior of different kinds of wood. By R. Nowotny, (D.) 148
——Joint ownership, 681
——Powell saccharine process for preserving. By R. E. Neale, (D.) 861
——Reinforced wooden, at ground line, Tests of, *394
——Steel, Carbo Steel Post Co., *708
——Strength of cross-arms and poles, 702
Porch lamp, Utility of, 457
Posts:
——Reconstructed lamp post, Cincinnati, *697
——Reinforced wooden, Portable, hand-operated mixer, *489
——Turning gas-lamp posts into tungsten standards, New Orleans, *481
Potential theory. By A. Korn, (D.) 1022
Potentiometer, Alternating-current, for measuring telephone currents. By C. V. Drysdale, (D.) *392
Power distribution. (See Transmission of electric energy)
Power factor, Economical value of method for improving. By Gisbert Kapp, (D.) 653
Power generation:
——Kilowatt-hour costs of combination system, Analysis of, Pacific Gas & Electric Co., 238
——Sociological and industrial aspects of centralization. By Samuel Insull, 119
——(See also Central-station practice)
Power plants. (See Central stations; Industrial plants; Office buildings)
Power transmission. (See Transmission of electrical energy)
Precision resistors for high-frequency alternating currents. By K. W. Wagner and A. Wertheimer, (D.) 98, 247
President Woodrow Wilson's Message to Congress, 1143, 1144

*Indicates illustrated articles.

Pressure regulation. By E. Wyatt, (D.) 345
Pressure rises. By W. Duddell, (D.) 1228
Production of electrical energy, Cost of. By H. M. Hobart, (D.) 703
Public relations discussed by New York Electric Railway Association, 1198
Public service commissions:
——Failure of "home rule" in Washington, 561
——Personnel of commissions, 525
——Rate regulation, Problem of. By W. J. Norton, 414; Comment, 410
——Regulation by, Effect on dividends, 460
——Regulation by, Growth of public sentiment, 460
——Regulation of public utilities. By J. H. Reomer, 531; Discussion, 516; Comment, 509; By J. M. Eshleman, 1197; G. L. Hoxie, 1246
——Relation to Bureau of Standards. By E. B. Rosa, 941
Public service corporations:
——Co-operative effort, Value of. By J. H. Collins, 829
——Government investigation, 828
——Model public utility bill, 1199, 1248
——New Jersey, Regulations for, 888
——Public confidence in. By William McClellan, 575
——Rate regulation by state commissions. By W. J. Norton, 414; Comment, 410
——Regulation, Government suit against American Telephone & Telegraph Co., 221; Comment, 218. By R. N. Vail, 365
——Trust legislation for, Report of Secretary of Commerce, 1246
——(See also Public service commission)
Pulley with protection from the weather, *201
Pumping, Electric:
——Irrigation work. By H. B. Walker, 783
Red Willow, Neb., 1112
——Oil-pumping costs reduced, San Joaquin, Cal., 1061
——West Springfield, Mass., water-works, 335
——Utica, N. Y., water-works, 602
Pumping outfit and transformer station, Floating, *207
Pumps:
——Cellar drainer, Electric, *1233
——Dayton Pump Co., *301
——Duplicate operation of hot-well pump, *42
——Fire protection, University of Michigan, *1168
——Fire-pump controller, Motor-driven alternating-current, *499
——Goulds rotary, with gear impellers, *446
——Stepbearing oil pump, Automatic control, *341
——Turbo air pump, *206
Pupin coil, Science and art of, 1325
Pyrometers:
——Brown high-resistance electric, *658
——Radiation of, Total. By G. K. Burgess and P. D. Foote, (D.) 496

Q

Quartz fibres, Low resistance, for instruments. By H. B. Williams, (D.) 1125

R

Radiant energy and its absorption in the eye. By M. Luckiesh, *844; Comment, 827
Radiation pressure. By G. D. West, (D.) 247
Radiation, Selective, from various substances. By W. W. Coblentz, (D.) 96
Radioactivity, Recoil atoms from thorium C and actinium C. By A. B. Wood, (D.) 1073
Radio-telegraphy:
——Antenna resistance. By L. W. Austin, (D.) 98
——Coast and ship stations in different countries. By H. Thurn, (D.) 861
——Contacts between bad conductors, Theory of. By W. H. Eccles, (D.) 861
——Demonstrating station for schools. By J. J. C. Mueller and J. R. Grall, (D.) 496
——Detectors. By W. H. Eccles and R. Morretti, (D.) 200
——Earth antennas, Results of measurements with. By F. Kiebitz, (D.) 298
——Electromagnettic waves, Nature of. By G. W. O. Howe, (D.) 759
——Energy transmission in. By M. Reich, (D.) 1023
——Fessenden patents upheld by Court of Appeals, 939
——French apparatus, (D.) *247
——High-frequency generator, a modification of the Duddell singing arc. By R. Moretti, (D.) *913; S. M. Kintner, 1017
——High-frequency oscillations from direct-current. By W. I. Book, (D.) *393
——Laws of wireless to be codified, 1144
——Marconi system developments. By E. Nesper, (D.) 441
——Measurements of energy, Comment on article by M. Reich, 1034
——Measuring frequency. By Mandelstam and Papalexi, (D.) *199
——Norwegian-American contract, 4
——Patents suits, 1098
——Receiving intensity, Year's study of. By H. Mosler, (D.) 759
——Short-circuited terms in circuits. By Louis Cohen, 899; Comment, 879
——Steamship protection, Volturno destroyed by fire, 769
Radio-telegraphy: (Continued)
——Study by International Society, 937
——System used by Société Francaise Radio-Electrique. By G. W. O. Howe, (D.) 346
——Time Signals, German. By H. Thurn, (D.) *440
——Transmission of signals by means of diffraction. By W. H. Eccles, (D.) 759
——Weather and the wireless. By A. H. Taylor, *425; Comment, 411
Radium:
——Deposit in the electric field. By E. W. Wellisch, (D.) 1174
——Determination of, in radio-active substances. By A. L. Fletcher, (D.) *1229
——Disintegration of. By A. W. Makower and S. Russ, (D.) 44
——Gamma rays, Scattering and absorption of. By J. A. Gray, (D.) 1073
Railless traction in Great Britain. By H. England, (D.) 97
Railway Signal Association, Annual convention, 833
Railways:
——Berlin Elevated and Subway, Extensions, (D.) 495
——Canada, Railway commission to regulate rates, 272
——Canadian Northern, High-voltage direct-current locomotives, 729
——Chicago:
Street railway underground-contact system proposed, 120
Surface and elevated lines, Central station energy for. Terms of Contracts; Economies effected, 1110; Comment, 1089
——Chicago, Milwaukee & St. Paul, Main line electrification, 1093
——Direct-current traction at 1200 volts. By H. J. Mulder, (D.) 912
——Electrification:
Advantages of various systems. By G. Kapp, (D.) 703, 810
Discussion by A. H. Armstrong, 1304; Comment, 1298
Discussion. By W. Usbeck, (D.) 654
Discussion by Gisbert Kapp at British Association for the Advancement of Science, 614
Electrification of lines in cities to avoid smoke nuisance, Decision of Pennsylvania Supreme Court, 723
Electrification in United States studied by English officials, 1149
Northwestern United States. By E. E. Wachsmann, (D.) 439
Progress in electric traction. By W. Reichel, (D.) 198; (D.) 810
Safety and, 878
——Gary & Interurban, Change from 12,000 to 33,000 volt transmission, *387
——Germany:
Accidents. By H. Alertz,, (D.) 1282
Statistics. By G. Dettmar, (D.) 97
——Great Britain:
General conditions, (D.) 860
Rules for employees. By A. V. Mason, (D.) 97
Statistics. By A. J. Lawson, (D.) 439, 600
——Inclined, Electrically operated, for unloading coal, on a high river, *597
——Interurban tramways in Great Britain, Increasing profits on. By E. H. Edwardes, (D.) 97
——Italian State Rys., Direct-current locomotives, (D.) 600
——Limitations of the capacity of rapid transit railways in cities. By Brugsch and Briske, (D.) 912
——Loetschberg, Simplon Tunnel route, Electric locomotives for, *1009; Comment, 986
——London, Statistics. By A. J. Lawson, (D.) 147
——London, underground, Lots' Road station, (D.) 97
——Mountain railway electrification. By A. H. Babbock, 629
Direct-current shunt motors. By Reutener (D.) 198
French Pyrenees. By A. Gradenwitz, (D.) 439
——Multiple-unit control, Thury system, (D.) 246
——Norfolk & Western, Locomotives, Combination single-phase and polyphase, 268, 367, *674
——Norwegian, Report on proposed electrification, (D.) 1124
——Paris Metropolitan, Statistics, (D.) 345
——Pennsylvania, Electrification of suburban line, 617
——Philadelphia, Municipal railways proposed, 268
——Prussian-Hessian, Test of motor cars of different types. By W. E. Weyand, (D.) 198
——Purchased power for Chicago surface and elevated lines. Terms of contracts. Economies effected, 1110; Comment, 1089
——Saxony, Electric traction in, (D.) 198
——Spain, Single-phase, from Pamploma to Sanguesa. By Wagenknecht, (D.) 198
——Stray currents, German regulations concerning. By J. Rautenkrantz, (D.) 549
Railways: (Continued)
——Switzerland, Spiez-Brig single-phase line. (D.) 1124, 1173, 1228
——Track construction, 1883 to 1913. By F. Bland, (D.) 97
——Twin City Rapid Transit Co., Development of generating system. Unit costs with water power, steam engines and steam turbines. Increasing the efficiency, *1049
——Wireless train control, Prentice automatic system, Exhibition in England, 757
——Worcester Consolidated Street Ry., Hydro-electric power:
Distribution, conversion and utilization of energy, *737
Transmission lines, sub-stations and outdoor switching installation, *685; Comment, 670
Range, Electric, Hughes, *657
Rate making, Intangible values, 123
Rates (See Charging for electric energy)
Razor, Electric, *973
Reading optophone. By E. E. F. d'Albe, (D.) *1023
Receptacle and polarity plug, Arrow, *602
Receptacles:
——Pass & Seymour, for wooden molding and pipe taplets, *706
——Revolving-head, Central Electric Co., *760
——Sign receptacle with removable screw shell, Arrow, *812
Recording instruments, Pen lifter for, *552
Records of distribution lines. By H. A. Holmes, *291, *338
Rectifier-tube operating records at Detroit, 240
Rectifiers, Electrolytic, Use of hollow aluminum cathode. By Karl Siegl, (D.) 653
Reel, Combined take-up and pay-out, Klein, *863
Reflectors (See Incandescent-lamp fixtures)
Refrigeration:
——Central station point of view. By E. F. Tweedy, (D.) 297; C. H. Stevens, 695
——Chicago office building, 25
——Combination electric plant and refrigerating equipment, Carbondale, *865
——Comparative costs of motive power in ice manufacture. By R. H. Tait and L. C. Nordmeyer, 755
——Comparative costs of operating ice factory by oil engines and electric motors. By C. E. Rose, *1225
——Cost of operating evaporators in a 20-ton ice plant, 491
——Data on electrically operated plants. By C. H. Stevens, 696
——Discussions at American Society of Refrigerating Engineers, 802
——Discussions at International Congress of Refrigeration, 630, 848
——Exhibit at Chicago, 657
——Greenhouse refrigeration near Chicago, *841
——Hampton, Va. By A. R. Smith, *371
——Ice-making an ideal adjunct, 484
——International Congress, Chicago, 512
——Power cost in the artificial ice factory, 1161
——Quick-freezing ice can, Parsons, *446
——Seattle, Wash., Diamond Ice Co., *49
——Weatherford, Okla., Municipal plant, *430
Refuse, Electricity from, 424
Regulation, Pressure. By E. Wyatt, (D.) 345; R. L. Morrison, (D.) 654
Relays, Protective:
——Merz-Price system, 598
——Nicholson patent, (D.) 44
——Use of. By Emil Hauser, (D.) 1282
Remover for printing presses, Static-electricity, Allsop, *1177
Renewals of lamps. (See Charging for electric current)
Repairing broken switch panel, 858
Resale price fixing. By F. D. Fish, 516
Reservoir, Storage, of Great Northern Power Co., Duluth, Minn., 1159
Resistance and reactance of alternating-current circuits surrounded by magnetic conducting material. By W. V. Lyon, *1006; Comment, 987
Resistance:
——Brush-contact. By Hay, Bratt and Parish, (D.) 244
——Comparing, Modification of Carey Foster method. By F. Wenner, (D.) *150
——Electric, of pure metals at Helium temperatures. By H. K. Onnes, (D.) 654
Resistors:
——Concrete, for lightning arresters, *541
——Cooper patent for high temperatures, (D.) 44
——High resistance. By N. Campbell, (D.) 1341
——Ten-megohm "resistance box," (D.) 149
Resonators for short electric waves, Study of linear and non-linear. By W. S. Nelms and W. L. Severinghaus, (D.) 199
Resuscitation from electric shock, Hero-medal plan suggested by Dr. Lauffer, 613
Rheostats:
——Energy absorption in starting motors. By J. Saint-Germain, (D.) 1022
——Inexpensive loading. By H. A. Broughton, (D.) 496
——Starting resistor, Calculating design of, (D.) 1072
Roentgen-ray interference phenomena. By M. von Laue and W. Friedrich, (D.) 1228; Comment, 1194
Roentgen-ray tubes, Tests of, by means of instruments. By Fr. Klingfuss, (D.) 346

*Indicates illustrated articles.

Roentgen rays:
——Crystals and rays. By W. H. Bragg, 618
——Reflection. By H. G. J. Moseley and C. G. Darwin, (D.) 148
Rolling mills, (See Industrial plants)
Rubber-covered wire, (See Wires, wiring and conduits)
Rubber insulation committee of manufacturers and users, Conference in New York, 828
Rural distribution, (See Agriculture, Electricity in)

S

Safety exposition. (See International Exposition of Safety and Sanitation)
St. Lawrence and Great Lakes Commission, 168
Sales department. (See Central-station business)
San Francisco. (See Panama-Pacific International Exposition)
Schedules. (See Charging for electric current)
Sea water temperature annunciator, McNab patent, (D.) 970
Searchlamp, Tests of, with a mirror. By Georges, (D.) 245
Search-lantern on observation car, *640
Securities. (See Financial)
Seismograph, New Improvements. By J. J. Shaw, (D.) 759
Ships, Electricity on:
——Battleship equipment. By H. A. Hormor, (D.) 654
——Driving submarine ships, (D.) 439
——Electrically propelled ship, Jupiter, 882
——"Tynemount," on the Great Lakes. Diesel-type engine prime movers and Mavor multi-frequency alternating-current drive, *947; Comment, 934
Shock, Electric, Effect on human body. By H. Gerbis, (D.) 248
Sign and decorative lighting:
——Billboard advertising, Chicago, *186
——Boston:
Motor-cycle sign, *1061
Multiple ornamental flame arc, *523
Regulation, 645
——Brookline, Mass.:
Anti-suffrage sign, *288
Curved real estate sign, *751
——Danger signs, Illuminated, *154
——Fall River, Mass. 317
——Ft. Wayne, Ind., Ordinance covering signs, 745
——Fort Worth, Texas, *645
——Interchangeable, A. & W. Electric Sign Co., *151
——Library Bureau, Cambridge, Mass., *36
——Montgomery, Ala., 542
——New York Edison Co., *485
——New York's billboard commission, 509
——New York's sane Fourth of July, *65
——Prismatic sign, La Pearl, *1129
——Puget Sound Traction, Light & Power Co., White River station, *1116
——Reflective light, Use of, Framingham, Mass., *499
——St. Louis, Union Electric Light & Power Co., *91
——San Antonio, Tex., 290
——San Diego, Cal., 32,000-lamp sign, 1118
——Shadow portrait, Electric lighted, *920
——Springfield, Mass., 1246
——Stanley & Patterson interchangeable sectional units, *1176
——Sterling, Ill., Motto of the city, 958
——Studying the electric sign, 669
——Toledo Railways & Light Co., *1062
——Toledo's slogan signs, *1273
——Town identification, Lee, Mass., *804
——Tubular signs, Sterling, *347
——Washington, D. C., Central station sign, *656
——Worcester, Mass., Chimney sign, *594
Sign manufacturers, Meeting of, in Chicago, 1148
Signals:
——Automatic block, Berlin elevated railways. By O. Wehland, (D.) 297
——Construction work signalling apparatus, *917
——Discussions by Railway Signal Association, 833
——Switchboard signalling, Keokuk power station, *444
Skin effect in cylindrical conductors, plates and rails. By R. Swyngedauw, (D.) 969
Slip meter, Horschitz, *444
Smoke damage in cities, Pittsburgh, 843
Society for Electrical Development:
——Activities, 65, 727
——Advantage obtained from membership. By H. L. Doherty, 365
——Co-operation with contractors. By Ernest Freeman, 317
——Co-operative movement. The opinions of leading men in the industry, 1251; Comment, 1241
——Cost of membership, W. E. Robertson on, 221
——Effect on the individual. By F. E. Watts, 413
——Jovian co-operation in membership campaign, 462
——Meeting at Association Island, Lake Ontario, 514, 518
——Membership campaign. By J. M. Wakeman, 460; 517, 519
——Pioneer member week, 772, 880
——Principles and objects. By T. Robert Crouse, 169; Comment, 165; L. A. Osborne, 269; 517, 518
Society for Electrical Development: (Continued)
——Progress made, 364
——Purposes of. By F. A. Vanderlip, 1036
Society for Promoting Engineering Education, Annual meeting, 12
Society of the United States Military Telegraph Corps, Annual meeting, 460
Sockets:
——Arrow Electric Co., *706
——Chi-Ill-Electric receptacle, *47
——Cutler-Hammer all-porcelain, *47
——Pass & Seymour fuseless, *151
Soldering ladles, Safety, *1224
Soot blower for superheaters, Heine, *551
Soot cleaner, Vulcan, *1076
Spark discharges, Electrodynamics. By Szarvassi, (D.) 1021
Spark gap, Effect of dialectric, spark-lag. By J. P. Minton, (D.) 345
Sparking, Supppressing, at interruptor contacts by shunting with condenser. By W. Burstyn, (D.) *1072; Comment, 1034
Spectrum analysis, Quantitative. By G. A. Shook, (D.) 970
Speed, Close measurement of. By N. M. Hopkins, 136
Speed meter for automobiles, Siemens-Halske, (D.) *912
Standard Gas & Electric Co., Effect of regulation by commission on dividends, 460
Statistics of the electrical industry in 1909, 881
Steam heating. (See Heating, District)
Steam turbines. (See Turbines, Steam)
Steel:
——Electric refining. By O. Frick, (D.) 654; J. Harden, (D.) 758
——Silicon, Reluctivity. By J. D. Ball, (D.) 911
——Tempering, Electrical refrigeration for, St. Louis, 288
Stoker, Mechanical with V-grate, 965
Stone & Webster Engineering Corporation, Organization and method of, 68
Stop-watch and revolution counter, Electrically operated, De Lay, *300
Storage batteries:
——Charging methods of various companies, 41, 882
——Control by counter-emf cells, St. Louis, Mo., *1267; Comment, 1242
——Gould automobile battery, *202
——Non-corrosive terminal for small battery, Philadelphia, *973
Storage-battery plates, Hannover production of porous, (D.) *1228
Storerooms, Roller skates for employees, New Bedford, Mass., *432
Stores (See Office buildings)
Strainer for condensing-water intake, Rotating, *146
Street lighting:
——Arlington, Wash., "Booster" illumination, *489
——Berlin, Germany. By Louis Bell, 638
——Boston, Mass.:
Luminous-arc, *469
Refusal to purchase gas-lighting equipment, 5
——Brookline, Mass., *1266
——Brussels. By Louis Bell, 637
——Cambridge, Mass., Luminous-arc, *469
——Chicago, 804
Cost. By Ray Palmer, 290
Cost of construction and operation of flame-arc system and tungsten series underground system, 38
Dearborn Street, 1332
North Clark Street, *1016
——Cologne. By Louis Bell, 638
——Control by means of alarm clocks, Leetonia, Ohio, *1223
——Cost of operating and rates to municipalities in Illinois. By S. B. Cushing, 1065
——Davenport, Ia., Christmas decorations, *1302
——Denver:
Decorations for the Knights Templar, *521
First use of incandescent lamps, *1166
——Discussion by Pennsylvania Electric Association, 623
——Dixon, Ill., Inverted-magnetite lamps, *804
——Dresden, Tungsten lamps, 3; By A. Strauss, (D.) 757
——Eldorado, Kan., Concrete standards, *1331
——Electric arc versus gas lighting, (D.) 911
——European cities. Wide use of tungsten and flame-arc lamps. By Louis Bell, 637
——Fort Wayne, Ind., *594
——Frankfort, Germany. By Louis Bell, 638
——Gas lighting, High-pressure, in Europe and America, 140
——Germany and Austria, Statistics. By L. Rosenbaum, (D.) 1071
——Hannibal, Mo., 90
——Hiawatha, Kan. By H. S. Woods, *1116
——Leetonia, Ohio, Alarm-clock control of lighting, *1223
——London. By Dr. Louis Bell, 336
——Los Angeles, Cal., 30-mile boulevard near, *1165
——Luminous arc systems:
Ann Arbor, Mich. By D. W. Hayes, 416
Boston, Cambridge and Lynn, Mass., *469
Discussion. By L. Burpee, 183
Lynn, Mass., *469
Owatonna, Minn., *645
Worcester, Mass., 1117
——Mattoon, Ill., Turgstens, *487
Street lighting: (Continued)
——Milwaukee, Wis.:
Christmas festoons, *1248
Cost, 577
Municipal plant not favored by Wisconsin Railroad Commission, 613
——Mount Vernon, N. Y., 903
——Munich, Germany. By Louis Bell, 638
——Niagara Falls, N. Y., *1219
——Ornamental lighting in residential districts. By J. R. Cravath, *1264
——Paducah, Ky., 237
——Paris. By Louis Bell, 637
——Fincher Creek, Alberta, Tungsten layout, *489
——Public square lighting, Leipzig, Germany. By A. Kastalski, (D.) 912
——Specifications, British controversy, 217
——Specifications, Comparison of British and American, (D.) 390; Comment, 363
——Tampa, Fla., Ornamental tungstens, *435
——Theater approach, Worcester, Mass., *338
——Uskub, Macedonia, 1320
——Washington, D. C., 140
Street lighting tables for 1914, 1247
Substations:
——Accident at Harding Avenue, Chicago, 1068
——Atlanta, Ga., Georgia Railway & Power Co., *1309
——Automatic. By W. R. Summerhayes, 19
——Basement and sub-basement. By B. G. Jamieson, *20
——Bombay, India, *954
——Chattanooga & Tennessee River Power Co., *1000
——Cold weather portable house, *295
——Connecticut River Transmission Co., *685
——Georgia Railway & Power Co., *1309
——Industrial, Modern practice. By H. P. Liversidge, 781
——Mine station, Washington Water Power Co. By J. B. Fisken, 629
——Outdoor station, 300-kw. 33,000-volt, 814
——Portable, for coal mine, *1232
——Waterloo, Iowa, *177
——Worcester, Mass., *737
Suction lifter for use with punch presses, *1179
Sugar industry, Electric drive in. By W. S. Scott, (D.) 1124
Sun, Electromagnetic effects of. By Father Cortie, 675
Surface combustion, Bonecourt process, 362
Surge indicator, Operation of, 910
Switchboard signalling, Keokuk power station, *444
Switchboards:
——Alternating-current, electrically operated. By C. H. Sanderson, (D.) 495
——Design. By S. Q. Hayes, 678
——Detroit ironclad, *1285
——Development of the bench type. By Emil Bern, (D.) 969
——Reconstruction at Milwaukee, *806
——Relays for the protection of power systems. By D. Basch, (D.) 495
——Roller-Smith automatic charging and lighting panel, *1343
Switchbox, Supporting plate for, *551
Switch panel, Repairing broken, 858
Switch pull-rods in tension not compression, *243
Switches:
——Air-brake, 150,000-volt, Southern Sierras Power Co., Calif., *234
——Delta-Star high-tension pole-top, *1232
——Detroit ironclad entrance, *1344
——Disconnecting switches, Value of, 1298
——General Electric automatic apparatus, *102
——Oil, and long-distance transmission. Discussion by German Association of Electrical Engineers, (D.) *859
——Oil, Breaking capacities. By S. Ferguson, (D.) 1339
——Oil, Breaking of contact. By A. Simon, (D.) 495
——Oil-switch installation in restricted space, *598
——Pendant, An improvised. By R. P. Heller, 487
——Repair of oil switch, *341
——Safety catches for disconnecting, 1070
——Selector, for restoring series circuits, Nichols-Lintern, *249
——Test of oil switch in Norwegian station. By M. Vogelsang, (D.) 199
——Trumbull round handle snap switch, *301
——Westinghouse magnet, *710
Switching operations on low-and-high-tension systems. By W. W. Lewis, (D.) 913
Symbols, Systems of, proposed by the British Association, 670
Syndicate interests in central stations, Statistical analysis of number of plants operated by holding companies or other controlling interests, and by independent owners and municipalities, 482; Comment, 458

T

Tabulating machines for small central stations, *863
Tacoma, Wash., Nisqually River Development. By R. H. Richards, *227
Tariff. (See Charging for electric energy)
Tariff matters, U. S., 512, 669, 726
Tea pot, Electrically heated earthenware, Rochester, 499

*Indicates illustrated articles.

Telegraphy:
——German experiment station. By K. Strecker, (D.) 913, 970
——Gott system. By H. Dreisbach, (D.) 1341
——Government ownership of telegraph lines, Investigation by Congressman Lewis, 725; Comment, 721; By Burleson, 1198
——Harvard-Yale football game, Cambridge, Mass., Electrical service at, *1147
——Printing telegraph, Siemens automatic high-speed, (D.) 248
——Siemens & Halske high-speed telegraph. By A. Franke, (D.) 861, 914
——Simultaneous telephony and telegraphy. By H. S. Warren, (D.) 970
——Submarine, Influence of cable inductance upon duplex balances. By George Wald, (D.) 441
——Submarine, Sine wave transmission. By H. W. Malcolm, (D.) 914, 970, 1074, 1175
——System on a 45,000-volt transmission line. By M. Meyer-May, (D.) 1126
Telephone enunciators, Loud-speaking, *251
Telephone associations, Rival, 1094
Telephone exchanges:
——Mechanical devices to assist manual operation of. By W. Slingo, (D.) *45
——Posen, Germany, Semi-automatic, (D.) 392
——Traffic distribution in manual. By J. Baumann, (D.) 655
Telephone patents, 39, 91, 142, 241 293, 340, 386, 436, 490, 543, 596, 647, 699, 906, 964, 1017, 1118, 1221, 1274, 1333
Telephone Pioneers of America, Annual meeting, 831
Telephone rates, Telephone commissioners on, 939
Telephone relay using cathode ray discharge tube. By Eugene Reiss, (D.) *1283
Telephone transmitter, Nose-mouth. By O. C. Roos, 596
Telephonic measurements. By A. Ebeling, (D.) 811
Telephony:
——Alternator for measuring currents. By A. Eberling, (D.) 1022
——Artificial lines, Tests of. By A. E. Kennelly and F. W. Lieberknecht, 15
——Austria, Dalmatia included in. By E. F. Petristch, (D.) 441
——Automatic long distance. By H. M. Friendly and A. E. Burns, *16
——Cable systems of the world. By Max Roscher, (D.) 1341
——Call-a-phone system, Stromberg-Carlson, *916
——Gong attachment for station telephone, *808
——Government ownership of lines, Investigation by Congressman Lewis, 725; Comment, 721; By Burleson, 1198
——Induction coils in shunt for telephone circuits. By L. Cahen, (D.) 861
——Inductive interference. By G. Girousse, (D.) 1341
——Insulation conditions of Austrian lines. By R. Nowotny, (D.) 1023
——Long-span construction lines, *650
——Mine rescue equipment, Western Electric Co., *204
——Oklahoma demands trunk-line connections, 273
——Potentiometer for measuring currents. By C. V. Drysdale, (D.) *392
——Railway way-station test boards, *1233
——Regulation of companies, Government suit against American Telephone & Telegraph Co., 221; Comment, 218; By R. L. Lunt, 340; T. N. Vail, 365
——Simultaneous telephony and telegraphy. By H. S. Warren, (D.) 970
——Statistical article on developments in the world. By W. H. Gunston, (D.) 655
——Submarine cable, Gulf of Georgia. By E. P. La Belle and L. P. Crim, 629
——Submarine cables, Thompson system. By Bela Gati, (D.) 550
——Transmission calculations. By A. J. Aldridge, (D.) 98; Comment, 62
Test lamps, Field excitation, *41
Testing:
——Alternating-current machinery, (D.) 1126
——Cable networks. By B. Andran, (D.) *550
——Integrating methods in alternating-current. By F. Bedell, (D.) 1125
Testing sets:
——American Transformer Co.'s portable high-voltage, *708
——Thompson-Levering portable, *604
Texas Power & Light Co., Convention of managers, 772
Thermal conductivities, Electrical methods for comparing. By William Eves, (D.) *655
Thermomagnetic potential difference, Longitudinal. By A. W. Smith. (D.) 1125
Thermometer chart for turbine ventilation, *145
Thermopiles, Bismuth. By W. W. Coblentz, (D.) 1340
Three-phase lines, capacity and voltage drop. By G. P. Markovitch, (D.) 440
Three-wire direct-current systems. By A. Lauteren, (D.) *439
Three-wire, grounded-neutral delta-connected secondary distribution system in Waterloo, Iowa, *177
Tides, Using power of, for generation of electrical energy, (D.) 1072
Timber preservation. (See Poles)
Time switch, Alarm-clock, 1342
Toaster, Electric:
——Canadian Westinghouse, *1025
——National, *347
Torch for soldering connections, Linemen's, *497
Toronto:
——Electrical Show, *1042
——Proposed sale of utilities to the city, 832
Torsion dynamometer. By H. Georges and P. Weidig, (D.) *149
Towers. (See Transmission)
Trackless trolley bus, Field Electric Bus Co., 103
Tractor, Atlas storage battery, *1233
Traffic statistics for London in 1912. By A. J. Lawson, (D.) 1022
Transformation from two-phase to three-phase. By H. de Pistoye, (D.) 1338
Transformation, Step-up, Where it would not pay, 146
Transformers:
——Alarm connection for, *598
——Angular parallel connection of series, 1280
——Connections, Waterloo, Ia. By Austin Burt, *386
——Cooling coils for large high-tension, National Pipe Bending Co., *396
——High power, Pacific Light & Power Corp. By W. M. Dann, (D.) 494
——Increasing unit capacity. By J. L. Buchanan, 678
——Manhole, Westinghouse, *349
——No-load current of, Calculating. By M. Vidmar, (D.) 1071
——Oil-insulated pole-type, Packard, *707
——Outdoor, Design and construction. By A. D. Fishel, 368
——Parallel operation, 967
——Pole-type. By C. E. Sisson, 70
——Ratio of transformation in the general transformer with distributed windings. By F. Niethammer and E. Siegel, (D.) 599
——Resonance phenomena. By O. Naumann, (D.) 1071
——Size, for induction motor load, Rules. By J. L. Moon, (D.) 297
——Testing potential. Investigation by Bureau of Standards. By H. B. Brooks, (D.) 705
——Testing shunt instrument. By H. B. Brooks, *898; Comment, 878
——Three-phase, for distributing purposes, 363
——Toy, Thordarson, *442
——Two-phase to three-phase auto-transformers. By R. E. Uptegraff, *589; R. W. Van Norden, 805; W. T. Taylor, *907
——Water relay on piping, *858
Transmission of electrical energy:
——Air-brake switches, 150,000-volt, Southern Sierras Power Co., Calif., *234
——Atmospheric discharges, Protection against, by use of condensers. By P. Lang, (D.) 861
——Atmospheric disturbances. By G. Capart, (D.) 969
——Automobile trailers for line construction crews, *754
——Belgard large high-tension networks. By A. Petri, (D.) 197
——Calculation of lines. By A. Blondel, (D.) 549
——Calculating network diagrams. By H. Frohmann, (D.) 1022
——Calculations, Graphical statics applied to. By Alfred Still, *230; Comment, 219
——Capacity of lines. By G. P. Markovitch, (D.) 147
——Capacity of single-phase lines and cables, Formulas for. By C. A. Pierce and F. J. Adams, *327; Comment, 315
——Central Georgia Transmission Co., (D. R.) 97
——Change-over, Quick, from 12,000 to 33,000 volts, Gary & Interurban Ry. Co., *387
——Charts for determining tension in spans, Blondel, 769
——Chattanooga & Tennessee River Power Co., *1000
——Cheap apparatus for connecting the isolated consumer with lines of moderate voltage. By E. B. Merriam, (D.) 297
——Cheap pole-line construction at Cleveland, 1016
——Cheap line construction, 267
——Connecticut River Transmission Co., *688
——Constant-voltage methods. Advantages of. By H. B. Dwight, 81
——Corona. (See Corona)
——Cross-arms on poles, Temporary, to aid construction cruise, *488
——Cross-arms, Reduced cost of iron-pipe, Marion, Ind., *857
——Crossings, Overhead, Illinois rules, 39, 576
——Determining line regulation, Effects of resistance, reactance and capacity. By E. P. Peck, 368
——Discussion by Ohio Electric Light Association, 233
——Distribution of electrical energy. By Samuel Insull, 514
——Distribution of electrical energy over large districts. By Klingenberg, (D.) 97, 246, 297
——Hysteresis and eddy-current losses in towers, Pacific Light & Power Cor., Los Angeles, Cal., *1108; Comment, 1091
——Ice loading, Effects of. By V. H. Griesser, 629
——India, Tata high-head development supplying power to Bombay, *953
Transmission of electrical energy: (Continued)
——Inductive interference, Report of California State Railroad Commission, 733; Comment, 723
——Insulators, Changing on live circuits, Marion, Ind., *594
——Italy. By Louis Bell, 956
——Japan, Calculation for 1180-ft. transmission span. By K. Nogami, *277; Comment, 266; J. B. Leeper, 436
——Long distance transmission. Discussion by German Association of Electrical Engineers, (D.) 859
——Long-span construction for telephone lines, *650
——Maximum loads on transmission lines. By H. P. Dwight, (D.) 859
——Milwaukee Electric Railway & Light Co., Construction practice on 13,200-volt lines, *697
——Non-elastic and elastic catenaries. By C. A. Pierce, F. J. Adams and G. I. Gilchrist, 18
——Operating results with a 2300-volt single-wire ground-return line, Benton Harbor, Mich., *595
——Oscillations in direct-current networks. By G. Seivt, (D.) *599
——Panama, Side-bracket 44,000-volt construction, *241
——Panama Canal Zone, Combination distribution system, 1095
——Pantograph overhead construction. By J. Simy, (D.) 569
——Poles, Calculation of, with suspension insulators. By Hans Gruenholz, (D.) 440
——Records of distribution lines. By H. A. Holmes, *291, *338
——Rhone River transmission to Paris, (D.) 1021
——Sag of lines, Table of proper, Southern California Edison Co., 286
——Sand-blast action of desert winds on wires, By Arthur Palme, 900
——Steel tower line, 60,000-volt, Southern California Edison Co. By H. W. Dennis, *281
——Submarine line in the Baltic Sea, *280
——Support of long span by messenger cable, Ann Arbor, Mich., *1219
——Switzerland. By Louis Bell, 956
——Tallulah Falls, Ga., *1309; Comment, 1297
——Testing cable networks. By B. Andran, (D.) *550
——Three-phase lines, Capacity and voltage drop. By G. P. Markovitch, (D.) 440
——Three-phase lines, Inductance and capacities of. By Louis Cohen, (D.) 297
——Towers, Strength of. By K. Nogami, 277; J. B. Leeper, 436; R. D. Coombs, 544; K. A. Lundquist, 699
——Trolley-wire construction. By W. von Moellondorff, (D.) 1282
——Underground distribution for small cities. By S. B. Hood, 10
——Voltage rises, Calculations of. By P. M. Verhoeckx, (D.) 1022; Comment, 986
Transmission plants:
——Connecticut River Transmission Co., Worcester railway system:
Distribution, conversion and utilization of energy, *737
Transmission lines, substations and outdoor switching installation, *685; Comment, 670
——Depreciation of, on the Pacific Coast. By Dr. Louis Bell, *379
——India, Tata high-speed development supplying energy for Bombay. Cotton mills as principal load; 100,000-volt transmission lines, *950; Comment, 935
——Kentucky Utilities Co., Rural district service, *1208
——Keokuk, Ia., Historical review on development, *462
——Ontario Hydro-Electric Power Commission, 4, 271
——Rheinfelden. By E. Frey and O. Albrecht, (D.) 757, 810, 969, 1072, 1173
——Rhone River transmission to Paris, (D.) 1021
——Silesian Gas & Electric Co., Upper Silesia, Germany, *1203
——Southern California Edison Co., 60,000-volt steel-tower line. By H. W. Dennis, *281
——(See also Central stations)
Transmutation of elements. Occluded gases in Geissler tubes. By R. W. Lawson, (D.) 1022
Trolley-wire construction. By W. von Moellondorff, (D.) 1282
Trolley-wire slack take-up for lift bridge, *909
Trucks, Industrial, Electric:
——Anderson milk wagon, *603
——Chicago, Marshall Field & Co., *1161
——Comparison with gasoline machines. By S. G. Thompson, 184
——Cost comparison of electric and gasoline with horse and wagon, 484
——Cost of repairs and maintenance, 847
——Couple-Gear Freight Wheel Co., Coal truck, *397
——Denver, Colo., Central-station business, 748
——Energy consumption, 652
——Freight handling. By W. W. White, 1094
——Front-wheel individual-motor drive, Clarence L. Smith Co., *1180
——General Vehicle Co:
Performance in Chicago, 380
Shaft-driven, *921

*Indicates illustrated articles.

Trucks, Industrial, Electric: (Continued)
——Hartford, Conn., Battery interchange system on mileage basis, *473
——Hunt storage battery, *1128
——Ice hauls, Long, in Southern city, 431
——Increasing efficiency of truck fleet, 959
——Indoor service. By Day Baker, 901
——Massachusetts, Number in, 1217
——Massachusetts registrations, Increased, 321
——Meat delivery, Economical. By Day Baker, 320
——New York freight pier service, *202
——Number in use in United States, 1012
——Parcels-post service, 1345
——Remedy for trouble, 484
W. Hillman, 429
——Sales to merchants by central stations. By H.
——St. Louis Board of Education, for distributing supplies, 187
——Specifications, Ten points in, 87
——Springfield, Mass., Savings, 747
——Van Auken light-weight, *1176
——Waverley, *656
Trucks, Industrial, Gasoline, London omnibuses, 204
Tungsten:
——Joining to copper, British patent, (D.) 246
——Vapor pressure of metallic. By Irving Langmuir, (D.) 1172
Tungsten lamps. (See Incandescent lamps; Charging for electric current)
Tunnels, Ventilation of using electrical energy, 36
Turbines, Hydraulic, Runaway at Underwood, Ore., 491
Turbines, Steam:
——Blade cover, Sectional, Decision upholding Emmet patent, *992
——Brush radial-flow reaction, 1127
——Design of high-speed. By T. Pausert, (D.) 1124
——Development of, 569
——Exhaust steam, Utilization of. By F. L. Richter, (D. R.) 198
——Little Rock, Ark., Merchants' Lighting Co., *1101
——Ljungstrom radial-flow, (D.) 912
——Load on double-turbine unit, 343
——Speed reduction, Mechanical gearing systems, (D. R.) 97
——Terry improved design, *866
——Twin City Rapid Transit Co.'s plant, 1050
Turbo air-pump, *206
Turbo generators:
——Diehl-Terry, for marine use, *48
——Fire hazard in. By G. S. Lawler, 1200
——Interborough Rapid Transit Co., 353
Typewriter, Crawley motor-driven, *47

U

Unification (See Central stations, Syndicate interests)
Uniform Electric Rate Association, 673, 828
——Monopoly and rate discrimination, Opinion of L. D. Brandeis, 826
Units:
——Myriawatt as the boiler-horse-power. By H. G. Stott, W. D. Weaver, 92
——Watt versus horse-power, 1
Uranium, Disintegration of. By Alexander Fleck, (D.) 758

V

Vacuum cleaners, Electric:
——Duntley, *921
——Hurley, *100
——National "Red Wing." 497
Vacuum tubes. Heating effect at the cathode in. By B. Gogson and P. A. Mainstone, (D.) 704
Valves:
——Crane emergency cut-out, *921
——Electrostatic. By O. Steels, (D) 600
Vehicle transmission system, Battery conserving, *294
Ventilation:
——Buildings. By J. M. Mears, (D.) 391
——Recirculated air, Experiment in Minneapolis schoolroom, 173, 266; By D. M. Liddell, 490; M. W. Franklin, 544
——Steam-turbine engine room. By E. Knowlton, (D.) 654
Vermont Commission news, 224, 735
Volt, Value of the standard, 967
Volta effect. By A. E. Hennings, (D.) 391
Voltage regulator, General Electric pole-type, *104
Voltmeter, Westinghouse iron-loss, *251

W

Washer for cross-arms, *658
Washing machines, Electric:
——Conlon, *395
——Contest at Chicago, 89
——Saving by use of, Estimated, 485
Washington Public Service Commission, Failure of "home rule," 561
Water heater, Electric, Cutler-Hammer, *1284
Water-meter factory, Electric power in, *694
Water power:
——Canadian Commission, 168, 272
——Concentration in ownership. By Gifford Pinchot, 1040; Comment, 1033
——Georgia, Encouragement of development, 990
——Illinois conference, 616
——Lassen National Forest, Cal., 576
——Long Sault, Report of Canadian Conservation Commission, 272
——Massachusetts hearings, 1303
——National Conservation Congress, 1039; Action of, 1096; Comment, 1090
——Utilization versus waste, 1033
——Wisconsin regulations, 121, 168, 267
——(See also Hydroelectric developments)
Water purification:
——Hypochlorite disinfectant, (D.) 392
——Ozone purification in office building, *1345
——Sterilization by ultra-violet rays. By Dr. Max von Recklinghausen, *181; Comment, 167
Water sterilizer, Electric, *553
Water-works, Electric operation:
——Chevy Chase Club, Washington, D. C., *299
——Farmington, Mich., *756
Watt versus horse-power, 1
Watt-hour meters:
——British limits of error, 289
——British specification. By S. H. Holden, (D.) 1229
——Location, on switchboards, 493
——Milli-hour stop-pendulum, San Francisco, *242
——New York, Acceptance tests, 944
——Tests of six American direct-current meters. By T. T. Fitch, (D.) 550
——Testing for central-stations. By C. W. Ward and H. N. Stroh, *538
Wattless currents defined, 1171
Wattmeters:
——Connection to power-factor meters, 1280
——Integrating, with recording attachments, Pick and Downing. By H. S. Baker, 184
Wave filters, High-frequency. By G. M. B. Shepherd, (D.) 98
Wave-form, Alternating, Condenser-current method for determining. By Frederick Bedell, *378; Comment, 361
Wave-form in surges, Calculation of dangerous rises of voltage on transmission lines. By P. M. Verhoeck, (D.) 1022; Comment, 986
Waves, Electric:
——Composite waves. By K. Fischer, (D.) 1229
——Multiple reflection of short waves from screens of metallic resonators. By W. L. Severinghaus and W. S. Nelms, (D.) 148
Waves, Electromagnetic. By K. W. Wagner, (D.) 757
Waves for the generation of electrical energy, (D.) 1072
Weather vane, Electrical, New Bedford, Mass., *34
Welding, Electric:
——Apparatus of C. & C. Electric & Mfg. Co., *205
——Cost data, 1120
——Investigation of the welding of sheets. By Otto Fuchs, (D.) 150
——Oil-engine-driven apparatus, Siemund Wenzel Electric Welding Co., *706
West Virginia Commission news, 466, 631, 683, 1099
Westinghouse, George, receives Grashof medal, 1145; Comment, 1142
Wharf, Motor-operated, Montgomery, Ala., *590
Wind, Electric. By J. R. Boom, (D.) 1125
Window display platform, Mercantile Advertising Co., *1176
Window displays (See Advertising)
Winding diagrams, Alternating-current. By G. Moores, (D.) 1227
Wireless telegraphy (See Radio-telegraphy)
Wires, wiring and conduits:
——Alternating-current conductors for heavy currents, Design of. By Michalke, (D.) 391
——Aluminum and copper cables, Properties of, and various systems of electrical transmission. By B. Welbourn, (D.) 148
——Battery-room wiring of electric vehicle factory. By T. W. Poppe, *850
——Calculation of transmission lines. By A. Blondel, (D.) 549, 810; Comment, 769
——Careless station wiring, 1297
——Chicago, Continental and Commercial National Bank building, Wiring of, *189, 542
——Cleats for wiring, Adjustable construction, *250
——Compensation induction coils in high-tension cables. By J. Kühle, (D.) 296
——Conduit fittings, Appleton, 552
——Counter wired at low cost, *1016
——Development of rubber-covered wire specifications for house wiring. By H. T. Wreaks, 383
——Dielectric measurements of cables. By M. Klein, (D.) 391
——European and American practice. By A. H. Bernhard, 646
——Extension lamp in 600-volt series circuit, *488
——Faults in cables, Location of, (D.) *704
——"Fishing" wire through pipe by means of vacuum cleaner, 488
——Ft. Wayne, Ind., Ordinance to prevent theft of electricity, 1116
——Fusing currents for copper wire, 493
——German rules for rubber insulated conductors, (D.) 704
——Guaranteed wiring. By Ernest McCleary, 171; L. J. Auerbacher, 436
——Laying single-phase cables in iron pipes. By L. Bloch, (D.) 246; Comment, 219
——Resonance in tests. By Andre Leaute, (D.) 861
——Rules of the Hydro-Electric Power Commission and the National Electric Code compared. By H. F. Strickland, 69
——Safety factors in vulcanized bitumen mining cables. By C. J. Beaver, (D.) 297
——Standard conduit, 172
——Steel-taped cable for series circuits, Chicago, 435
——Submarine power transmission cables in Germany, (D.) 246
——Submarine telephone cables, Thompson system. By Bela Gati, (D.) 550
——Submarine transmission line cables in the Baltic Sea, *280
——Supporting vertical feeders, 547
——Switchboard wiring, Testing high-tension, 967
——Wall cabinet for universal houses, *1234
——(See also Central-station business)
Wisconsin Electrical Associaton, Convention, 1300
Wisconsin Electrical Contractors' Association, Annual meeting, 367
Wisconsin Railroad Commission:
——Methods for regulation of public utilities. By J. H. Reomer, 531; Discussion, 516; Comment, 509
——News, 224, 273, 417, 466, 632, 683, 735, 834, 945, 1098, 1201, 1306
Wisconsin water power bill, 121, 168, 268
Woolworth building, New York City, Elevator equipment, safety features, generating plant and wiring. By C. E. Knox, *125; Comment, 114

Z

Zinc status and future prospects, (D.) 1228
Zirconium, Valve action of. By L. H. Walter, (D.) 861

AUTHOR INDEX

ADAMS, F. J. (See Pierce, C. A.)
Armstrong, G. E. Handling, sampling and testing of transformer oil, *1322
Auerbacher, L. J. Guaranteed wiring by contractors, 436
Austin, H. D. Hotel-room lighting, 1333

BAEKELAND, L. H. Legalized blackmail, 1146
Baldwin, A. T. Carbon and impregnated electrodes for arc lamps, *793
Bedell, Frederick. Condenser-current method for the determination of alternating wave-form, *378
Bell, Louis. Electric heating and lighting in England, 413
——Electrical service in European cities, 637
——European electrical matters, 1054
——London's transportation and lighting, 366
——Study in depreciation, *379
——Swiss and Italian transmission-line construction, 956
Bennett, E. C. Progress of the Jovian Order, 143
Bernhard, A. H. European and American wiring practice, 646
Briton, A. Electrical enterprise in England, 1205
Brooks, H. B. Testing shunt instrument transformers, *898
Brown, C. W. Diversity-factor and load-factor, 1119
Burt, Austin. Waterloo transformer connections, *386

CAMPBELL, D. T., Portrait of, *625
Charles, R. W. The elevator as a central-station load, 1017

*Indicates illustrated articles.

Cohen, Louis. Effect of a short-circuited secondary on an oscillating circuit, 899
Conklin, L. H. Rates for electric service, 1167
Coombs, R. D. Strength of transmission powers, 544
Cravath, J. R. Eye as a judge of uniform illumination, 1118
——Intensities of natural and artificial light required for reading, 38
——Ornamental lighting in residential districts, *1264
Croft, Terrell. Insulating and grounding motors and generators, *908, *965
Culver, W. S. Combined synchronous and induction motor loads, 1275

DAWSON, C. S. The N. E. L. A. and motor service, 1333
Del Mar, W. A. The metric system and cables, 490
Dennington, A. R. Design of head-lamp light sources, *742
Dennis, H. W. 60,000-volt steel-tower line construction in Southern California, *281
Dey, H. E. Battery for experimental use, *1210
Dickinson, N. S. Graphic solution for illumination problems, *586
Dompieri, Gino. Associated Austrian technical societies, 753
Dorsey, H. G. Experiments in electroculture near Dayton, Ohio, *1217

FOSHAY, W. B. Hydroelectric plant on White Salmon river, *275
Franklin, M. W. A new motion in ventilation, 544
Fynn, V. A. Phase compensation, *28, *75, *132

HARRISON, WARD. Industrial lighting by incandescent lamps, *1001
Heller, R. P. An improvised pendent switch, 487
Holmes, H. A. Distribution line records, *291, *338
Hopkins, N. M. Close measurement of speed, 136
Horton, J. A. Unbalanced phases, 1280

AMES, L. V. Semi-indirect lighting units, *905
Jansky, C. M. Apportionment of off-peak load costs, 1275

KENNEDY, S. M. Rate for electric service, 1066
——Southern California Edison Company's method of disposing of electric appliances, *1062
Kintner, S. N. High-frequency generator, 1017
Knox, C. E. World's highest office building, *125

LATHROP, J. C. Station of the Northern Ohio Traction & Light Company at Cuyahoga Falls, *419
Leeper, J. B. Strength of transmission towers, 436
Leilich, F. T. Cost of factory motor service, 596
Liddell, D. M. A new notion in ventilation, 490
Luckiesh, M. Radiant energy and the eye, *844
——Visual acuity in white light, 1160
Lundquist, R. A. Strength of transmission towers, 699
Lunt, R. L. Solution of the telephone trust difficulty, 340
Lyon, W. V. Effective resistance and reactance, *1006

McCALL, J. B. The N. E. L. A. and motor service, 1119
Mackall, K. W. (See Porter, L. C.)
Mateer, R. B. Agricultural service in California delta lands, *36
Miller, W. H. Present status of the locomobile, *326
——Uniflow cylinder adapted to locomobiles, *689
Morecroft, J. H. Armature mmf relations in synchronous machines, *1106
Morss, Everett. Step toward metric system, 293
Morss, H. A. Measurement of peak voltage, 136
Moses, P. R. Rates for electricity, 853
Mott, W. R. Water in inclosed flame-arc lamps, 1220
Mudgett, F. G. Progress of Drum development of Pacific Gas & Electric Company, *1055

NOGAMI, K. Design of an 1180-ft. transmission-line span, *277

PALME, ARTHUR. Sand-blast action of desert winds on wires, 900
Patton, R. C. Fuse economy, 40
Pierce, C. A., and F. J. Adams. Formulas for capacity of single-phase transmission lines and cables, *327
Poppe, T. W. Battery-room wiring of electric-vehicle factory, *850
Porter, L. C. Performance of incandescent head-lamps, *744
Porter, L. C., and K. W. Mackall. Fundamental principles of head-lamp illumination, *141
Potamian, Brother. Some historical inaccuracies, 1221
Powell, A. L. (See Stickney, G. H.)

RICHARDS, R. H. Tacoma's Nisqually River development, *227
Robertson, W. E. Sale of supplies by central stations, 748
Roos, O. C. Nose-mouth telephone transmitter, 596
Rose, C. E. Comparative costs of operating ice factory by oil engines and electric motors, *1225

SMITH, A. R. Combination railway, electric and ice-making plant at Hampton, Va., *371
Smith, P. H. W. Copper-clad steel suit, 244
Soreng, E. M. Cost figures from Brookings, S. D., *1321
Spaulding, A. B. Alternating-current drive of a newspaper plant, *239
Steinmetz, C. P. Instability of electric circuits, 938
——Ozone machines and public health, 1093
Stickney, G. H., and A. L. Powell. Data concerning incandescent-lamp reflectors, 477
Still, Alfred. Graphical statics applied to transmission-line calculations, *230
Stott, H. G., The myriawatt, 92
Stratton, H. F. The N. E. L. A. and motor service, 1119
Stroh, H. N. (See Ward, C. W.)
Strohm, R. T. Burners for oil fuel, *342, *437
——Cleaning of oil fuel, *545
——Installation of oil burners, *1120
——Methods of spraying oil fuel, *491
——Oil-burning furnaces, *1018
——Oil fuel for steam boilers, *700
——Pumping and heating of oil fuel, *650
——Requirements for efficient burning of oil fuel, *145
——Storage of oil fuel, *1277
Sugg, C. R. Head-lamp illumination, *741

TAYLOR, A. H. Wireless and weather, *425
Taylor, W. T. Merits and the early history of some phase-transforming systems, *647
——Some phase-transforming systems, *907
Thiele, Theodore. A veteran incandescent lamp, *964
Thompson, E. P. Electrical invention, 194
Thompson, W. H. Ozone machines and public health, 1333

UPTEGRAFF, R. E. Two-phase to three-phase auto-transformers, *589

VANDERLIP, F. A. Financial needs of the electrical industry, 534
Van Norden, R. W. Two-phase to three-phase auto-transformer, 805
von Recklinghausen, Dr. Max. Water sterilization by ultra-violet rays, *181

WAKEMAN, W. H. Improving a high-speed engine, *242
Wallau, H. L. Combined synchronous and induction motor loads, 1057
Ward, C. W., and H. N. Stroh. Watt-hour meter testing for central-stations, *538
Weaver, W. D. Boiler-horse-power, 92
Wile, H. D. Test of a kerosene-oil engine, *389
Woods, H. S. Ornamental street lighting in Hiawatha, Kan., *1116
Wreaks, H. T. Development of rubber-covered wire specifications for house wiring, 383

*Indicates illustrated articles.